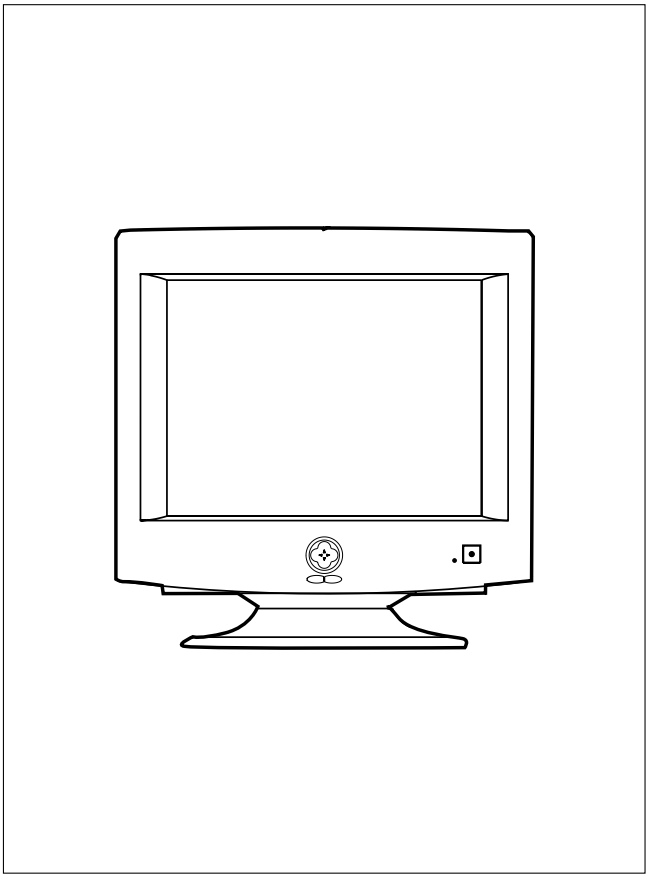
SAMSUNG

COLOR MONITOR

CKF5607L
(SyncMaster 500b Plus)

SERVICE Manual

COLOR MONITOR



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1 Precautions

1-1 Safety Precautions

WARNINGS

1. For continued safety, do not attempt to modify the circuit board.
2. Disconnect the AC power before servicing.
3. When the chassis is operating, semiconductor heatsinks are potential shock hazards.

1-1-1 Servicing the High Voltage VR and CRT :

WARNING: A high voltage VR replaced in the wrong direction may cause excessive X-ray emissions.

Caution: When replacing the high voltage adjustment VR, it must be fixed by a soldering iron after it is properly set.

1. When servicing the high voltage system, remove the static charge by connecting a 10 kohm resistor in series with an insulated wire (such as a test probe) between the chassis and the anode lead.
2. If the HV VR requires adjustment, (a) Replace the VR and adjust the high voltage to the specification. (b) Use a soldering iron to melt the adjustment cap on the HV VR to prevent any movement.
3. When troubleshooting a monitor with excessively HV, avoid being unnecessarily close to the monitor. Do not operate the monitor for longer than is necessary to locate the cause of excessive voltage.
4. High voltage should always be kept at the rated value, no higher. Only when high voltage is excessive are X-rays capable of penetrating the shell of the CRT, including the lead in glass material. Operation at high voltages may also cause failure of the CRT or high voltage circuitry.
5. When the HV regulator is operating properly, there is no possibility of an X-ray problem. Make sure the HV does not exceed its specified value and that it is regulating correctly.
6. The CRT is especially designed to prohibit X-ray emissions. To ensure continued X-ray protection, replace the CRT only with one that is the same or equivalent type as the original.
7. Handle the CRT only when wearing shatterproof goggles and after completely discharging the high voltage anode.
8. Do not lift the CRT by the neck.

1-1-2 Fire and Shock Hazard :

Before returning the monitor to the user, perform the following safety checks:

1. Inspect each lead dress to make certain that the leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the monitor.
2. Inspect all protective devices such as nonmetallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. Leakage Current Hot Check (Figure 1-1):
   WARNING: Do not use an isolation transformer during this test.
   Use a leakage current tester or a metering system that complies with American National Standards Institute (*ANSI C101.1, Leakage Current for Appliances*), and Underwriters Laboratories (*UL Publication UL1410, 59.7*).
4. With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: metal cabinets, screwheads and control shafts. The current measured should not exceed 0.5 milliamp. Reverse the power-plug prongs in the AC outlet and repeat the test.

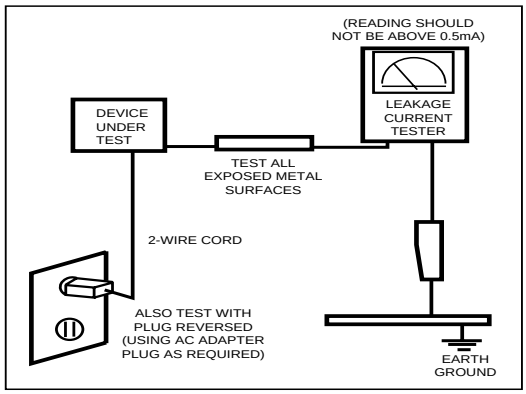

(READING SHOULD NOT BE ABOVE 0.5mA)
LEAKAGE CURRENT TESTER
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
EARTH GROUND

Figure 1-1. Leakage Current Test Circuit

1-1-4 Product Safety Notices

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection. The protection they give may not be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by ⚠ on schematics and parts lists. A substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and / or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

Components identified by ☢ on schematics and parts lists must be sealed by a soldering iron after replacement and adjustment.

1-2 Servicing Precautions

WARNING1: First read the "Safety Precautions" section of this manual. If unforeseen circumstances create conflict between the servicing precautions and safety precautions, always follow the safety precautions.

WARNING2: A high voltage VR replaced in the wrong direction may cause excessive X-ray emissions.

WARNING3: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet, and should be followed closely.
2. Always unplug the unit's AC power cord from the AC power source before attempting to: (a) remove or reinstall any component or assembly, (b) disconnect PCB plugs or connectors, (c) connect all test components in parallel with an electrolytic capacitor.
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the area around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).
6. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500 V) to the blades of the AC plug.

   The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
7. Never defeat any of the +B voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect a test instrument's ground lead to the instrument chassis ground *before* connecting the positive lead; always remove the instrument's ground lead last.

1-3 Electrostatically Sensitive Devices (ESD) Precautions

Some semiconductor (solid state) devices can be easily damaged by static electricity. Such components are commonly called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors. The following techniques will reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. To avoid a shock hazard, be sure to remove the wrist strap before applying power to the monitor.
2. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of an electrostatic charge.
3. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESDs.
4. Use only a grounded-tip soldering iron to solder or desolder ESDs.
5. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
7. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution: Be sure no power is applied to the chassis or circuit and observe all other safety precautions.
8. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting your foot from a carpeted floor can generate enough static electricity to damage an ESD.
9. ⚠ Indicates ESDs on the Schematic Diagram in this manual.

2 Reference Information

2-1 List of Abbreviations, Symbols and Acronyms

2-1-1 Abbreviations

Abbreviation	Definition
ASS'Y	Assembly
B	Blue
B+ ADJ	B+ Adjustment
B-CUT	Blue-Cutoff
B-GAIN	Blue Gain
BRIGHT	Brightness
C	R-Composition
C-MIC	Condenser Microphone
CLK	Clock
CM	R-Cement
CN	Connector
CONT	Contrast
D-SUB	D-Subminiature
EEP-CLK	Electrically Erasable and Programmable Clock
EXT	External
EXT-MIC	External Microphone
Freq.	Frequency
FU	Fusible
G	Green
G-CUT	Green-Cutoff
G-GAIN	Green Gain
GND	Ground
H	Horizontal
H	Heater
H-DRV	Horizontal Drive
H-DY	Horizontal Deflection Yoke
H-FLB	Horizontal Flyback
H-FV	Horizontal-Feedback Voltage
H-LIN	Horizontal Linearity
H-POSI	Horizontal Position
H-SIZE	Horizontal Size
H/PHONE	Headphone
Hz	Hertz
I-SENSE	Current-Sense
Ib	Pound
MAX	Maximum
MIC	Microphone
MIN	Minimum
MP	C-Metalized Polyester
MPP	Metal Polypropylene
MO	R-Metal Oxide

Abbreviation	Definition
OSC	Oscillator
P	C-Polyester
PARA	Parabola
PARALL	Parallelogram
PIN-BAL	Pincushion Balance
PRE-AMP	Pre-Amplifier
PS1	Power Saving1 (suspend)
PS2	Power Saving2 (off)
PWR	Power
R	Red
R-CUT	Red-Cutoff
R-GAIN	Red Gain
RST	Reset
S-PIN	Side Pincushion
S-RASTER	Self Raster
S/W	Switch
SCAP	S Correction Capacitor
SPK	Speaker
SYNC	Synchronization
T	C-Tantalum
TR	Transistor
TRAP	Trapezoid
U-COM	Microprocessor
V	Vertical
V-DY	Vertical Deflection Yoke
V-FLB	Vertical Flyback
V-LIN	Vertical Linearity
V-MUTE	Video Mute
V-OUT	Vertical Output
V-PARA	Vertical Parabola
V-POL	V-Polarity
V-POSI	Vertical Position
V-SENSE	Voltage-Sense
V-SIZE	Vertical Size
WW	R-Wire Wound
X-TAL	Crystal
Ω	ohm
KΩ	1000 ohm
MΩ	1000 KΩ
uF	microfarad (10^{-6}F)
nF	nanofarad (10^{-9}F)
pF	picofarad (10^{-12}F)

2-1-2 Symbols

- Can emit X-radiation
- Hot Ground
- Cold Ground
- Electrostatically Sensitive Device (ESD)
- Provides special safety considerations

2-1-2 Acronyms

Acronym	Definition
ABL	Automatic Brightness Limits
AC	Alternating Current
ACL	Automatic Contrast Limit
AFC	Automatic Frequency Control
ANSI	American National Standards Institute
CMOS	Complementary Metal Oxide Semiconductor
CRT	Cathode Ray Tube
DC	Direct Current
DDC	Data Display Channel
DF	Dynamic Focus
DMM	Digital Multimeter
DPMS	Display Power Management Signaling
DVM	Digital Voltmeter
DY	Deflection Yoke
EEPROM	Electrically Erasable and Programmable Read only Memory
ESD	Electrostatically Sensitive Device
ESF	Electronic Static Field
FBT	Flyback Transformer
FET	Field Effect Transistor
FH	Horizontal Frequency
FS	Fail Safe
FV	Vertical Frequency
GD	Geometric Distortion

Acronym	Definition
H/V	Horizontal/Vertical
HV	High Voltage
I/O	Input/Output
IC	Integrated Circuit
LED	Light Emitting Diode
MAC	Macintosh
MOFA	Mask Outside Frame Assembly
OCP	Over Current Protection
OP AMP	Operational Amplifier
OSD	On Screen Display
P-P	Peak to Peak
PCB	Printed Circuit Board
PLL	Phase Locked Loop
PWM	Pulse Width Modulation
SMPS	Switch Mode Power Supply
SVGA	Super Video Graphics Array
SWEDAC	
TP	Test Point
UL	Underwriters Laboratories
USB	Universal Serial Bus
VESA	Video Electronics Standard Association
VGA	Video Graphics Array
VR	Variable Registor
W/B	White Balance

3 Product Specifications

3-1 Specifications

Item	Description
Picture Tube:	15-Inch (38 cm): 13.8-inch (35 cm) viewable; Full-square flat-face tube, 90˚ Deflection, 0.28 mm Dot pitch, Semi- tint, Non-glare, Invar shadow mask, Anti-static silica coating
Scanning Frequency	Horizontal : 30 kHz to 70 kHz (Automatic) Vertical : 50 Hz to 160 Hz (Automatic)
Display Colors	Unlimited colors
Maximum Resolution	Horizontal : 1280 Dots Vertical : 1024 Lines
Input Video Signal	Analog, 0.714 Vp-p positive at 75 Ω, internally terminated
Input Sync Signal	Separate Sync : TTL level positive/negative Composite Sync : TTL level positive/negative
Maximum Pixel Clock rate	110 MHz
Active Display	Horizontal : 267 mm ± 3 mm, Vertical : 200 mm ± 3 mm
Input Voltage	AC 90 to 264 Volts, 60 Hz or 50 Hz ± 3 Hz
Power Consumption	85 Watt (max)
Dimensions Unit (W x D x H) Carton (W x D x H)	 14.6 x 16.2 x 15.2 Inches (370 x 410.6 x 385 mm) 18.3 x 20.4 x 17.7 Inches (465 x 517 x 450 mm)
Weight (Net/Gross)	29.9 lbs (13.6 kg) / 34.8 lbs (15.8 kg)
Environmental Considerations	Operating Temperature : 32°F to 104°F (0°C to 40°C) Humidity : 10 % to 80 % Storage Temperature : -4°F to 113°F (-20°C to 45°C) Humidity : 5 % to 95 %

- Above models comply with SWEDAC (MPR II) recommendations for reduced electromagnetic fields.
- Designs and specifications are subject to change without prior notice.

3-2 Pin Assignments

Sync Type / Pin No.	15-Pin Signal Cable Connector (Figure 3-1)		Cable Adapter (Figure 3-2)
	Separate	Composite	Macintosh
1	Red	Red	GND-R
2	Green	Green	Red
3	Blue	Blue	H/V Sync
4	GND	GND	Sense 0
5	DDC Return	DDC Return	Green
6	GND-R	GND-R	GND-G
7	GND-G	GND-G	Sense 1
8	GND-B	GND-B	Reserved
9	Reserved	Reserved	Blue
10	GND-Sync/Self-raster	GND-Sync/Self-raster	Sense 2
11	GND	GND	GND
12	DDC Data	DDC Data	V-Sync
13	H-Sync	H/V-Sync	GND-B
14	V-Sync	Not Used	GND
15	DDC Clock	DDC Clock	H-Sync

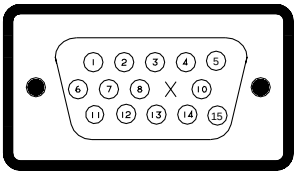


Figure 3-1. Male Type

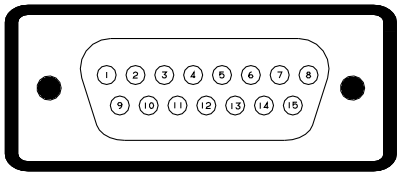


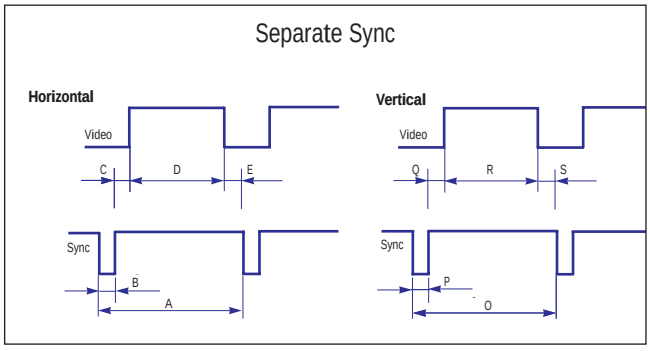
Figure 3-2. Male Type

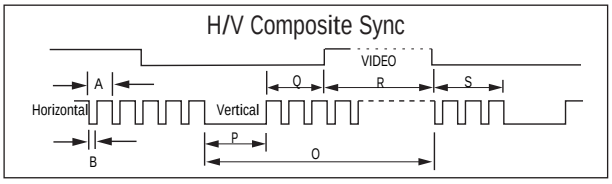
3-3 Timing Chart

This section of the service manual describes the timing that the computer industry recognizes as standard for computer-generated video signals.

Table 3-1. Timing Chart

Mode / Timing	IBM		VESA						Apple Mac.
	VGA2/70 Hz 720 x 400	VGA3/60 Hz 640 x 480	640/75 Hz 640 x 480	640/85 Hz 640 x 480	800/75 Hz 800 x 600	800/85 Hz 800 x 600	1024/85 Hz 1024 x 768	1280/60 Hz 1280 x 1024	640/67 Hz 640 x 480
fH (kHz)	31.469	31.469	37.500	43.269	46.875	53.674	68.677	63.980	35.000
A µsec	31.778	31.778	26.667	23.111	21.333	18.631	14.561	15.630	28.571
B µsec	3.813	3.813	2.032	1.556	1.616	1.138	1.016	1.040	2.116
C µsec	1.907	1.907	3.810	2.222	3.232	2.702	2.201	2.300	3.175
D µsec	25.422	25.422	20.317	17.778	16.162	14.222	10.836	11.850	21.164
E µsec	0.636	0.636	0.508	1.556	0.323	0.569	0.508	0.440	2.116
fV (Hz)	70.087	59.940	75.000	85.008	75.000	85.061	84.997	60.020	66.667
O msec	14.268	16.683	13.333	11.764	13.333	11.756	11.765	16.66	15.000
P msec	0.064	0.064	0.080	0.671	0.064	0.056	0.044	0.050	0.086
Q msec	1.080	1.048	0.427	0.578	0.448	0.503	0.524	0.590	1.114
R msec	12.711	15.253	12.800	11.093	12.800	11.179	11.183	16.010	13.714
S msec	0.413	0.318	0.027	0.023	0.021	0.019	0.015	0.020	0.086
Clock Frequency (MHz)	28.322	25.175	31.500	36.000	49.500	56.250	94.500	108.000	30.240
Polarity H.Sync	Negative	Negative	Negative	Negative	Positive	Positive	Positive	Positive	Negative
V.Sync	Positive	Negative	Negative	Negative	Positive	Positive	Positive	Positive	Negative
Remark	Separate	Separate	Separate	Separate	Separate	Separate	Separate	Separate	Composite





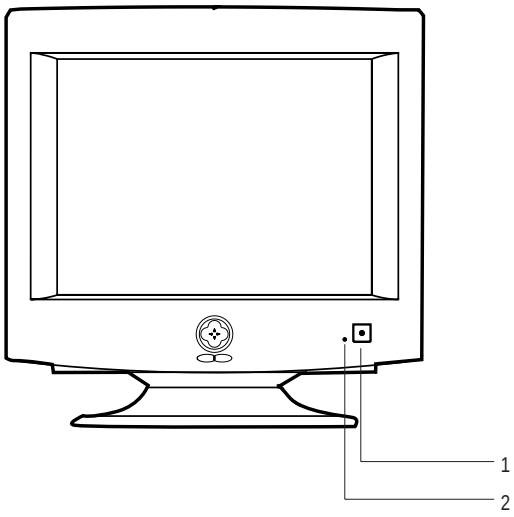
A : Line time total	B : Horizontal sync width	O : Frame time total	P : Vertical sync width
C : Back porch	D : Active time	Q : Back porch	R : Active time
E : Front porch		S : Front porch	

Memo

4 Opearating Instructions

4-1 Front View and Control

4-1-1 Front View



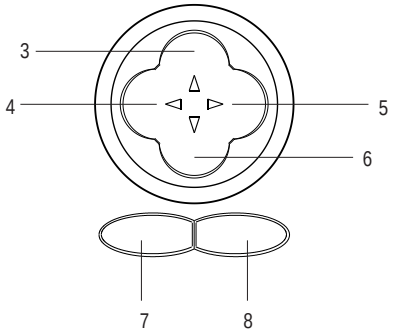


Figure 4-1. Front Control Panel

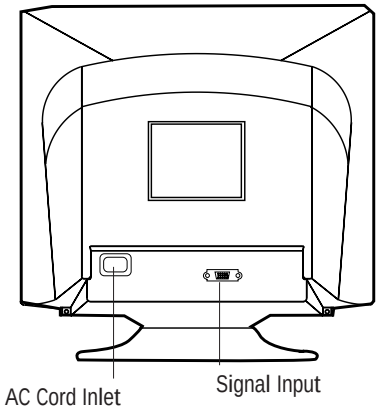


Figure 4-2. Rear View

Table 4-1. Front Panel Controls

Location	Symbol	Description
1	⏻	Power Button
2	○	Power Indicator LED (Dual Color)
3	▲	Up Button
4	◀	Left Button
5	▶	Right Button
6	▼	Down Button
7	⬭	Exit Button
8	⬭	Menu (↵) Button

4-2 Microprocessor Controls and Functions

This monitor has factory preset display settings for each of the signals listed in the standard Display Modes Timing Chart (see page 3-3). As a result, when the monitor senses one of the standard signal timings, it automatically adjusts to an optimum size and position.

However, the user may wish to adjust the monitor to their own preferred settings rather than use those preset at the factory. The monitor saves up to 11 user defined settings.

4-2-1 On Screen Display

This monitor features an On-Screen Display (OSD) that shows information about the display setting. The OSD appears on the screen when you select a function button. The OSD can show the name, range and current setting of the control function. In addition, the OSD shows the current input signal frequency and the list of user and factory preset timings. The OSD remains active for approximately 7 seconds after the completion of any adjustment.

4-2-2 OSD Window

Push the ↵ button to open the OSD. The Main Menu shows all of the adjustment icons along the top of the window. The Title Bar displays Main Menu and the icon for the last accessed function appears highlighted. The window shows one or more adjustment names in the Adjustment Box and instructions display in the Information Bar.

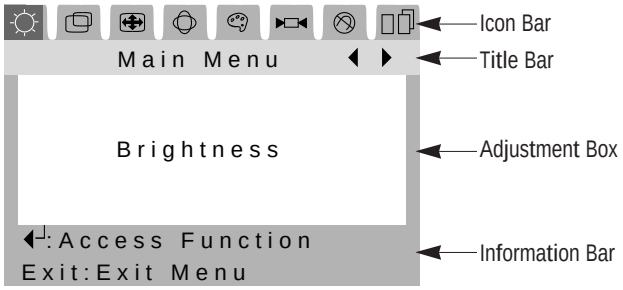


Figure 4-3. OSD Windows

To access a function, use the ◄ and ► buttons to move to its associated icon, and then use the ▼ or ▲ button to highlight the adjustment type. Then, push the ↵ button to access the function.

All OSD windows change color to indicate that the associated adjustment control is active. When the OSD displays the name of the adjustment, for example, Pincushion / Trap, with a green border, adjustments for pincushion or trapezoidal effects are available. Each OSD window shows directions for use along the bottom of the window. When you are satisfied with the adjustments you have made to the current control, select the Exit button to return to the OSD Menu where you can select another control, or exit from the OSD system and save your changes. The OSD remains active for approximately 7 seconds after completion of any adjustments.

4-2-3 Direct Controls

The on-screen Direct controls have the following two functions:

- Brightness: With the menu off, push the ▲ or ▼ button. The brightness display will appear. Push the ▲ button to increase the brightness or the ▼ button to decrease the brightness.
- Contrast: With the menu off, push the ◄ or ► button. The contrast adjustment display will appear. Push the ► button to increase the contrast or the ◄ button to decrease the contrast.

4-3 Power Management System

This monitor has a built-in power management system called PowerSaver. This system saves energy by switching your monitor into a low-power mode when it has not been used for a certain amount of time. The available modes are “On,” “Standby,” “Suspend,” and “Off.”

This system operates with a VESA DPMS compliant video card installed in your computer. You use a software utility installed on your computer to set up this feature. See the table below for details.

Note 1: This monitor automatically returns to normal operation when horizontal and vertical sync return. This occurs when you move the computer's mouse or press a key on the keyboard.

Table 4-2. Display Power Management Signaling (DPMS)

State / Items	Normal Operation	Power saving function EPA/NUTEK		
		Stand By Mode	Suspend Mode Position A	Power Off Mode Position B
Horizontal Sync	Active	Inactive	Active	Inactive
Vertical Sync	Active	Active	Inactive	Inactive
Video	Active	Blanked	Blanked	Blanked
Power Indicator	Green	Amber	Amber/Green Blinking	Amber Blinking
Power Consumption/hr	85 W (max.) 65 W (nominal)	50 W (nominal)	Less than 15 W	Less than 5 W

Note 2: This monitor is EPA Energy Star compliant and NUTEK compliant when used with a computer equipped with VESA DPMS functionality. If your computer system cannot support a display power management function, you can purchase an optional DPMS software program to enable the power saving function. Please contact Samsung or your dealer for more information.

Note 3: For energy conservation, turn your monitor OFF when it is not needed, or when leaving it unattended for long periods.

Note 4: The PowerSaver functions do not apply to sound functions and may cause sound abnormalities during its power saving modes.

Memo

5 Disassembly and Reassembly

This section of the service manual describes the disassembly and reassembly procedures for the CKF5607L monitor.

WARNING: This monitor contains electrostatically sensitive devices. Use caution when handling these components.

5-1 Disassembly

Cautions: 1. Disconnect the monitor from the power source before disassembly.
2. Follow these directions carefully; never use metal instruments to pry apart the cabinet.

5-1-1 Cabinet Disassembly

1. With a pad beneath it, stand the monitor on its front with the screen facing downward and the base close to you. Make sure nothing will damage the screen.
2. Working from the back of the monitor remove the 2 screws.
3. To uncover the 2 uppermost screws, press in the end of each screw cover cap and pull it away from the cabinet. Remove the Rear cover.
4. Using pinch-nosed pliers or long-nosed pliers, carefully disconnect the Anode Cap from the CRT.

Caution: Do not touch the anode contact on the CRT.

5-1-2 Removing the Video PCB

1. Complete all previous steps.
2. Remove the screw on the Main PCB which secures the braided ground wire on the Video Shield. Remove all other ground wires.
3. Unsolder the center tabs on the underside of the Video PCB Shield and remove the Video PCB Shield.
4. Using a knife, cut the silicone bond and lift off the CRT Socket PCB.
5. Lift off the Video PCB Ass'y.
6. Disconnect connectors CN101 and CN102 on the Video PCB.
7. Disconnect the red screen (G2) wire on the Video PCB.
8. Hold the Video PCB while you lift the cap on the CRT Socket. Disconnect the red Focus wire (G3).

5-1-3 Removing the Main PCB

1. Complete all previous steps.
2. Disconnect the Degaussing Coil at CN600 on the Main PCB.
3. Disconnect all easily accessible ground wires from the CRT GND Assembly and Bottom Chassis.
4. Disconnect the DY connector between the DY and the CN300, CN301, CN401, CN402 and CN403 connectors on the Main PCB.
5. Remove the 2 screws on the left and right sides of the PCB Bracket.
6. Carefully lift the Main PCB Ass'y.
7. Carefully lift off the Power Shaft from the Main PCB.
8. Disconnect the adjustment control connector CN201 on the Main PCB.
9. Remove the 6 screws on the top side of the Main PCB.
10. Lift the Main PCB and place it on a flat, level surface that is protected from static electricity.

5-2 Reassembly

With the CRT facing downward on a protective pad, use the steps that follow to reassemble the monitor.

5-2-1 Replacing the CRT

1. Loop the CRT Ground Assembly around the back of the CRT and under the 4 corner, metal ears. Position the corner with the spring last.
2. With the Front Cover Assembly lying face down on a protective pad, position the CRT so that the corner metal ears fit properly in the Front Cover Assembly.
3. Replace the 4 corner screws.
4. Replace the Degaussing Coil Assembly and wrap the coil with the plastic coated matal ties to hold the coil in place.
5. Replace the CRT Ground Assembly.
6. Replace the Unit Bracket Assembly.

5-2-2 Replacing the Main PCB

1. Stand the monitor on its front with the screen facing downward.
2. Replace the Power Shaft on the Main PCB.
3. Replace the 6 screws on the top side of the Main PCB.
4. Replace connector CN201 on the Main PCB.
5. Position the Main PCB Ass'y in the Front Cabinet and secure it on both sides with the screws between the Bottom Chassis and CRT Unit Bracket.
6. Replace the DY connector at the CN300, CN301, CN401, CN402 and CN403 connectors on the Main PCB.
7. Replace all easily accessible ground wires on the CRT GND Assembly and Bottom Chassis.
8. Replace the Degaussing Coil at CN600 on the Main PCB.
9. Replace the Anode Cap.

5-2-3 Replacing the Video PCB

1. Replacing the Focus (G3) wire on the CRT Socket and the screen (G2) wire on the Video PCB.
2. Replace connectors CN101 and CN102 on the Video PCB.
3. Reconnector the CRT Socket on the Video PCB.
4. Solder the center tab on the underside of the Video PCB Shield and replace the Video PCB Shield.
5. Replace the screw on the Main PCB which secures the braided ground wire from the Video Shield and replace all other ground wires.

5-2-4 Cabinet Reassembly

1. Complete all previous steps.
2. Position the Rear Cover making sure that the tabs along the front edge are properly snapped in place. Replace the 4 screws.
3. Set the monitor on its Base and make sure that the CRT faceplate was not scratched or otherwise damaged.

6 Alignment and Adjustments

This section of the service manual explains how to make permanent adjustments to the monitor. Directions are given for adjustments using the monitor Interface Board Ver. 2.0 and software (SoftJig).

6-1 Adjustment Conditions

Caution: Changes made without the SoftJig are saved only to the user mode settings. As such, the settings are not permanently stored and may be inadvertently deleted by the user.

6-1-1 Before Making Adjustments

6-1-1 (a) ORIENTATION

When servicing, always face the monitor to the east.

6-1-1 (b) MAGNETIC FIELDS

Whenever possible, use magnetic field isolation equipment such as a Helmholtz field to surround the monitor. If a Helmholtz field is not available, frequently degauss the unit under test.

Caution: Other electrical equipment may cause external magnetic fields which may interfere with monitor performance.

Use an external degaussing coil to limit magnetic build up on the monitor. If an external degaussing coil is not available, use the internal degaussing circuit. However, do not use the internal degaussing circuit more than once per 30 minutes.

6-1-1 (c) WARM-UP TIME

The monitor must be on for 30 minutes before starting alignment. Warm-up time is especially critical in color temperature and white balance adjustments.

6-1-1 (d) SIGNAL

Analog, 0.714 Vp-p positive at 75 ohm, internal termination
Sync: Separate, Composite
(TTL level negative / positive)

6-1-1 (e) SCANNING FREQUENCY

Horizontal: 30 kHz to 70 kHz (Automatic)
Vertical: 50 Hz to 160 Hz (Automatic)

Unless otherwise specified, adjust at the 800 x 600 mode (53.6 kHz / 85 Hz) signals.

Refer to Table 3-1 on page 3-3.

6-1-1 (f) HIGH VOLTAGE ADJUSTMENT

Signal: 53.6 kHz / 85Hz
Display image: crosshatch pattern
Contrast: Maximum
Brightness: Maximum
Limit: 25 kV ± 0.2 kV

Adjust VR501 to DC –204.0 V ± 0.5 V at EY14 and GND.

Measure the hight voltage level at the anode cap. High voltage should be within the limit as above. If the high voltage needs adjustment use the following procedure.

PROCEDURE

1. Turn the power off and disconnect the AC line cord from the power source.
2. Unsolder and remove VR501 on the Main PCB.
3. Replace VR501 and adjust the high voltage to the specification.
4. Using a soldering iron, melt the adjustment cap on VR501 to prevent any movement.

6-1-1 (g) G2 (SCREEN) VOLTAGE ADJUSTMENT

Signal: 53.6 kHz / 85Hz
Display image: crosshatch pattern
Contrast: Maximum
Brightness: Maximum

Adjust the Screen VR of the FBT so that the G2 (Screen) Voltage for Toshiba CRT is 630 V ± 10 V.

6-1-1 (h) CENTER RASTER

Adjust SW401 so that the back raster comes to the center when you apply a signal of 53.6 kHz / 85Hz.

6-1-2 Required Equipment

The following equipment may be necessary for adjustment procedures:

6-1-2 (a) DISPLAY CONTROL ADJUSTMENT

1. Non-metallic (–) screwdriver: 1.5 mm
   Non-metallic (–) screwdriver: 3 mm
2. Philips (+) screwdriver: 1.5 mm
3. Non-metallic hexkey: 2.5 mm
4. Digital Multimeter (DMM), or
   Digital Voltmeter (DVM)
5. Signal generator, or
   Computer with a video board that uses the ET-4000 chipset (strongly recommended if using Samsung DM 200 software) and that displays: 1024 x 768 @ 85 Hz, or 800 x 600 @ 85 Hz (minimum).
6. Personal computer
7. Required software: Softjig.exe from Samsung which includes the cg15b.c data file Samsung DM200, or DisplayMate for Windows from Sonera Technologies
8. Interface Board Ver. 2.0 Code No. BH81-90001K
9. Parallel communications cable (25-pin to 25-pin); Code No. BH81-90001H
10. Signal cable (15-pin to 15-pin cable with additional 3-pin connector); Code No. BH81-90001J
11. 5 V DC adapter, not supplied

Note: SoftJig Ass'y (includes items 8, 9 and 10) Code No. BH81-90001L

6-1-2 (b) COLOR ADJUSTMENTS

1. All equipment listed in 6-1-2 (a), above
2. Color analyzer, or any luminance measurement equipment

6-1-3 Connecting the SoftJig

Connect the monitor to the signal generator and / or PC as illustrated in Figures 6-1 and 6-2.

Note: The signal cable connector which includes the 3-wire cable must connect to the monitor. If you use Setup 2 (PC only, no signal generator) you can only make adjustments to the signal timing available on that computer system. To make corrections to all factory timings requires the use of an additional signal generator.

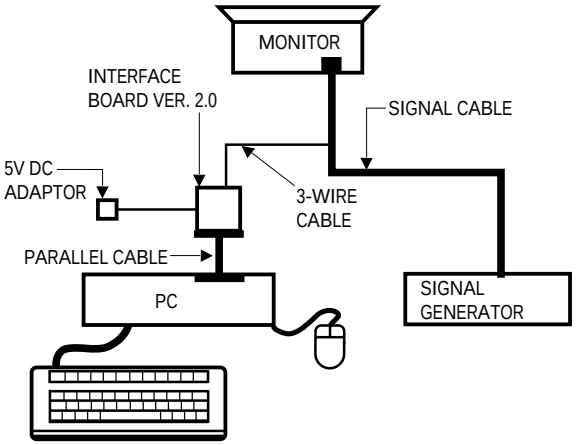


Figure 6-1. Setup 1, With Signal Generator

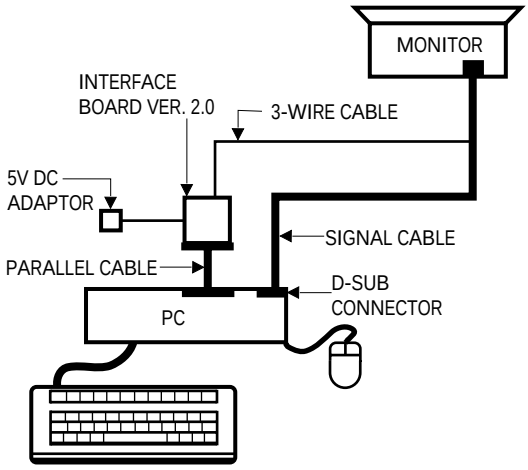


Figure 6-2. Setup 2, Without Signal Generator

6-1-4 After Making Adjustments

After finishing all adjustments, test the monitor in all directions. If, for example, the monitor does not meet adjustment specifications when facing north, reposition the monitor to face east and readjust. This time, try for an adjustment closer to the ideal setting within the tolerance range. Test the unit again in all directions. If the monitor again fails to meet specifications in every direction, contact your Regional After Service Center for possible CRT replacement.

6-2 Display Control Adjustments

6-2-1 Centering

Centering means to position the center point of the display in the middle of the display area. Horizontal size and position and vertical size and position control the centering of the display.

Adjust the horizontal size and vertical size to their optimal settings: 267 mm (H) x 200 mm (V)

Adjust the horizontal position and vertical position to ≤ 4.0 mm of the center point of the screen.

| A-B | ≤ 4.0 mm.
| C-D | ≤ 4.0 mm.

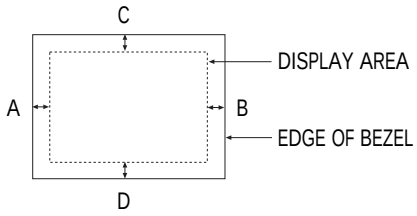


Figure 6-3. Centering

6-2-1 (a) HORIZONTAL SIZE ADJUSTMENT

CONDITIONS

Scanning frequency: 53.6 kHz / 85Hz
Display image: Crosshatch pattern
Brightness: Maximum
Contrast: Maximum

Click on the << or >> box next to **B+OUT** to adjust the horizontal size of the display pattern to 267 mm. (Tolerance: ± 3 mm.)

6-2-1 (b) VERTICAL SIZE ADJUSTMENT

CONDITIONS

Scanning frequency: 53.6 kHz / 85Hz
Display image: Crosshatch pattern
Brightness: Maximum
Contrast: Maximum

Click on the << or >> box next to **V_SIZE** to adjust the vertical size of the display pattern to 200 mm. (Tolerance: ± 3 mm.)

6-2-1 (c) HORIZONTAL POSITION ADJUSTMENT

CONDITIONS

Scanning frequency: 53.6 kHz / 85Hz
Display image: Crosshatch pattern

Click on the << or >> box next to **H_POSI** to center the horizontal image on the raster.

6-3-1 (d) VERTICAL POSITION ADJUSTMENT

CONDITIONS

Scanning frequency: 53.6 kHz / 85Hz
Display image: Crosshatch pattern

Click on the << or >> box next to **V_POSI** to center the vertical image on the raster.

6-2-2 Linearity

Linearity affects the symmetry of images as they appear on the screen. Unless each row or column of blocks in a crosshatch pattern is of equal size, or within the tolerances shown in Tables 6-1 and 6-2, an image appears distorted, elongated or squashed.

Table 6-1. Standard Modes Linearity: 640x480/75Hz, 800x600/85Hz and 1024x768/85Hz

	Standard Modes Linearity	
	Each block (10 %)	Difference between adjacent blocks (4 %)
4 : 3	Horizontal: 15.9~17.5 Vertical : 15.9~17.5	Horizontal: Less than 0.67 mm Vertical : Less than 0.67 mm

Table 6-2. Other Modes Linearity: VGA, SVGA, XGA, MAC, etc.

	Supported Timing Mode	
	Each block (14 %)	Difference between adjacent blocks (5 %)
4 : 3	Horizontal: 15.5~17.9 Vertical : 15.5~17.9	Horizontal: Less than 0.83 mm Vertical : Less than 0.83 mm

6-2-2 (a) HORIZONTAL LINEARITY ADJUSTMENT

The CKF5607L monitor offer only Vertical Linearity adjustments. Horizontal Linearity is fixed on the Chassis and is not adjustable.

6-2-2 (b) VERTICAL LINEARITY ADJUSTMENT

CONDITIONS

Scanning frequency:	53.6 kHz/85Hz
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

To adjust the Vertical Linearity, refer to Tables 6-1 and 6-2 for the tolerance range.

Click on the << or >> box next to **V_LIN** to optimize the image.

6-2-3 Trapezoid Adjustment

CONDITIONS

Scanning frequency:	53.6 kHz/85Hz
Brightness:	Maximum
Contrast:	Maximum

Click on the << or >> box next to **TRAPE** to make the image area rectangular.

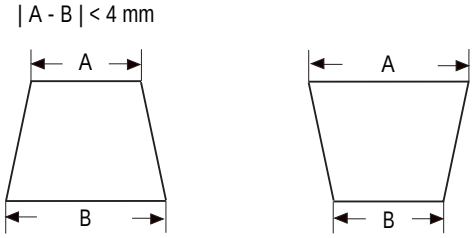


Figure 6-4. Trapezoid

6-2-4 Pinbalance Adjustment

CONDITIONS

Scanning frequency:	53.6 kHz/85Hz
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

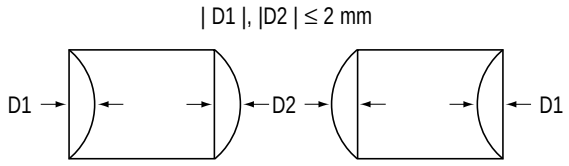


Figure 6-5. Pinbalance

Click on the << or >> box next to **PIN_BAL** to optimize the image.

6-2-5 Parallelogram Adjustment

CONDITIONS

Scanning frequency:	53.6 kHz/85Hz
Brightness:	Maximum
Contrast:	Maximum

Click on the << or >> box next to **PARALL** to make the image area rectangular.

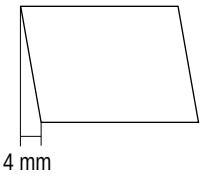


Figure 6-6. Parallelogram

6-2-6 Side Pincushion Adjustment

CONDITIONS

Scanning frequency:	53.6 kHz/85Hz
Display image:	Crosshatch pattern

Click on the << or >> box next to **BARREL** to straighten the sides of the image area.

| C1 |, | C2 | ≤ 2.0 mm, | D1 |, | D2 | ≤ 2.0 mm.

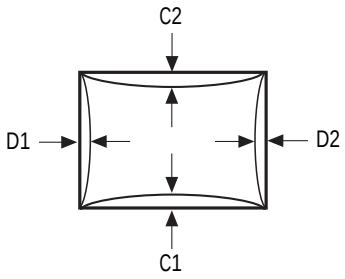


Figure 6-7. Pincushion

6-2-7 Degauss

No adjustments are available for the degaussing circuit. The degaussing circuit can effectively function only once per 30 minutes.

6-2-8 To Delete the User Mode Data

To delete the adjustment data from the user modes, click **USER DELETE.**

6-2-9 Save the Data

To save the adjustment data for a mode, press **FACTORY SAVE**.

6-3 Color Adjustments

6-3-1 Color Coordinates (Temperature)

Color temperature is a measurement of the radiant energy transmitted by a color. For computer monitors, the color temperature refers to the radiant energy transmitted by white. Color coordinates are the X and Y coordinates on the chromaticity diagram of wavelengths for the visible spectrum.

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	53.6 kHz / 85Hz
Display image:	White flat field at center of display area
Luminance:	Maximum

PROCEDURE

Use the directions in sections 6-3-2 through 6-3-3 to adjust the color coordinates for:
9300K to x = 0.283 ± 0.02, y = 0.298 ± 0.02
6500K to x = 0.313 ± 0.02, y = 0.329 ± 0.02

6-3-2 Color Adjustments for 9300K

6-3-2 (a) BACK RASTER COLOR ADJUSTMENT

CONDITIONS

Scanning frequency:	53.6 kHz / 85Hz
Display image:	Back raster pattern
Brightness:	Maximum
Contrast:	Maximum

1. Select **COLOR CHANNEL 1** to control the color for 9300K.
2. Adjust the luminance of the back raster to between 0.5 to 0.7 ft-L using the **G_CUT** controls.
3. Click on the << or >> box next to **B_CUT** to set the "y" coordinate to 0.298 ± 0.02.
4. Click on the << or >> box next to **R_CUT** to set the "x" coordinate to 0.283 ± 0.02.

   Note: If the above adjustments cannot be done to each coordinate, click on the << or >> box next to **G_CUT** to decrease or increase the green cutoff (bias) and repeat procedures 3 and 4.

6-3-2 (b) G-GAIN ADJUSTMENT

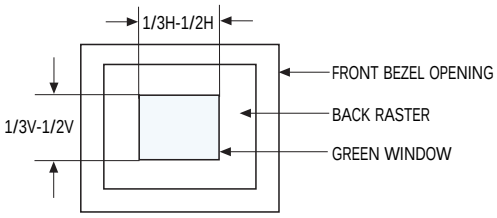


Figure 6-8. Green Box Pattern

CONDITIONS

Scanning frequency:	53.6 kHz / 85Hz
Display image:	Green box pattern
Brightness:	Maximum
Contrast:	Maximum

1. Click on the << or >> box next to **G_GAIN** to adjust the brightness of the Green Gain to 40 ± 1 ft-L.

   Note: If you can't increase the Green Gain to the appropriate value, click on the >> box next to increase the **ABL** point.

6-3-2 (c) WHITE BALANCE ADJUSTMENT

CONDITIONS

Scanning frequency:	53.6 kHz / 85Hz
Display image:	Full white pattern
Brightness:	Maximum
Contrast:	Maximum

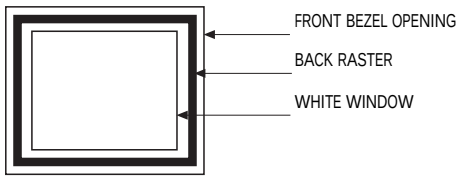


Figure 6-9. Full White Pattern

1. Click on the << or >> boxes next to **R_GAIN** and **B_GAIN** to make the video white. (For 9300K color adjustment: x = 0.283 ± 0.02, y = 0.298 ± 0.02.)

   Note: Do not touch the **G_GAIN** controls.

2. Check the ABL. If it is not within the specifications (35 ± 1 ft-L), use the ABL controls to adjust it.
3. Select **COLOR FACTORY SAVE** to save the data.
4. Select **ALL MODE SAVE** to save the CH2.

6-3-2 (d) WHITE BALANCE ADJUSTMENT VERIFICATION

CONDITIONS

Scanning frequency:	53.6 kHz/85Hz
Display image:	Back raster pattern
X-Y Coordinates:	x = 0.283 ± 0.02, y = 0.298 ± 0.02
ABL Luminance	37 ± 1 ft-L
Brightness:	Maximum
Contrast:	Maximum

1. Check whether the color coordinates of the back raster satisfy the above spec.

   If they do not, return to 6-3-2 (a) and readjust all settings.

2. Display a full white pattern.

Note: Do not touch the **G_GAIN** controls.

3. Adjust the Contrast Control on the monitor so that the luminance of the video is about 5 ft-L.
4. Check whether the white coordinates of the video meet the above coordinates spec.
5. Adjust the Contrast Control again so that the luminance of the video is about 24 ft-L.
6. Check whether the white coordinates of the video satisfies the above spec.

   If they do not, return to 6-3-2 (a) and readjust all settings.

6-3-3 Color Adjustments for 6500K

6-3-3 (a) BACK RASTER COLOR ADJUSTMENT

CONDITIONS

Scanning frequency:	53.6 kHz/85Hz
Display image:	Back raster pattern
Brightness:	Maximum
Contrast:	Maximum

1. Select **COLOR CHANNEL 2** to control the color for 6500K.
2. Adjust the luminance of the back raster to between 0.5 to 0.7 ft-L using the **G_CUT** controls.

Note: For 6500K adjustments you must not change the Screen VR of the FBT. To do so changes the 9300K setting values.

3. Click on the << or >> boxes next to **R_CUT** and **B_CUT** to adjust the R-Bias to x = 0.313 ± 0.02 and the B-Bias to y = 0.329 ± 0.02.

6-3-3 (b) G-GAIN ADJUSTMENT

This procedure is the same as that for 9300K, refer to the procedure on page 6-8.

6-3-3 (c) WHITE BALANCE ADJUSTMENT

CONDITIONS

Scanning frequency:	53.6 kHz/85Hz
Display image:	Full white pattern
Brightness:	Maximum
Contrast:	Maximum

1. Click on the << or >> boxes next to **R_GAIN** and **B_GAIN** to make the video white. (For 6500K color adjustment: x = 0.313 ± 0.02, y = 0.329 ± 0.02.)
2. Refer to the procedure for 9300K, section 6-3-2 (c) steps 2 and 3.

6-3-3 (d) WHITE BALANCE ADJUSTMENT VERIFICATION

Refer to the procedure for 9300K, section 6-3-2 (d).

6-3-4 Luminance Uniformity Check

Luminance is considered uniform only if the ratio of lowest to highest brightness areas on the screen is not less than 7:10.

CONDITIONS

Scanning frequency:	53.6 kHz / 85Hz (800 x 600)
Display image:	White flat field
Brightness:	Cut off point at 2.4 ft-L
Contrast:	Maximum

PROCEDURE

Measure luminance at nine points on the display screen (see figure below).

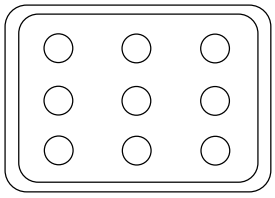


Figure 6-10. Luminance Uniformity Check Locations

6-3-5 Focus Adjustment

CONDITIONS

Scanning frequency:	53.6 kHz / 85Hz (800 x 600)
Display image:	"H" character pattern
Brightness:	Cut off point
Contrast:	Maximum

PROCEDURE

1. Adjust the Focus VR on the FBT to display the sharpest image possible.
2. Use Locktite to seal the Focus VR in position.

6-3-6 Color Purity Adjustment

Color purity is the absence of undesired color. Conspicuous mislanding (unexpected color in a uniform field) within the display area shall not be visible at a distance of 50 cm from the CRT surface.

CONDITIONS

Orientation:	Monitor facing east
Scanning frequency:	53.6 kHz / 85Hz
Display image:	White flat field
Luminance:	Cut off point at the center of the display area

Note: Color purity adjustments should only be attempted by qualified personnel.

PROCEDURE

For trained and experienced service technicians only.

Use the following procedure to correct minor color purity problems:

1. Make sure the display is not affected by external magnetic fields.
2. Very carefully break the glue seal between the 2-pole purity convergence magnets (PCM), the band and the spacer (see Figure 6-12).
3. Make sure the spacing between the PCM assembly and the CRT stem is 29 mm ± 1 mm.
4. Display a green pattern over the entire display area.
5. Adjust the purity magnet rings on the PCM assembly to display a pure green pattern. (Optimum setting: x = 0.295 ± 0.015, y = 0.594 ± 0.015)
6. Repeat steps 4 and 5 using a red pattern and then again, using a blue pattern.

Table 6-3. Color Purity Tolerances

Red:	x = 0.625 ± 0.015	y = 0.340 ± 0.015
Green:	x = 0.280 ± 0.015	y = 0.595 ± 0.015
Blue:	x = 0.150 ± 0.015	y = 0.063 ± 0.015

(For 9300K color adjustment: x = 0.283 ± 0.02, y = 0.298 ± 0.02)

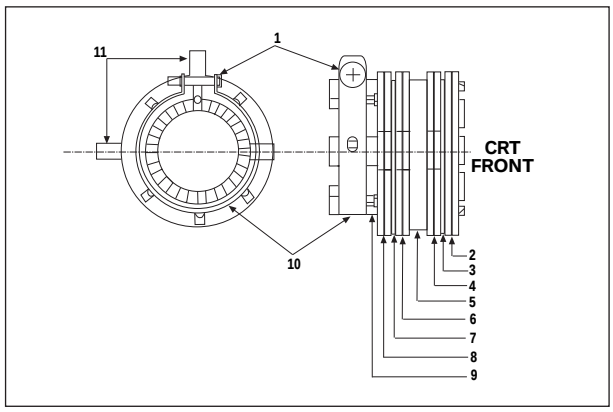
7. When you have the PCMs properly adjusted, carefully glue them together to prevent their movement during shipping.

6-4 Convergence Adjustments

Misconvergence occurs when one or more of the electron beams in a multibeam CRT fail to meet the other beams at a specified point.

Table 6-4. Misconvergence Tolerances

Position	Error in mm	CRT Dot Pitch
Center (A)	0.30	0.28
Edge (B)	0.40	0.28



Toshiba CRT			
1 Setup Bolt	2 Bow Magnet	3 Spacer	4 2-Pole Magnet
5 Band	6 6-Pole Magnet	7 Spacer	8 4-Pole Magnet
9 Holder	10 Band	11 Tabs	

Figure 6-11. Toshiba Magnet Configuration

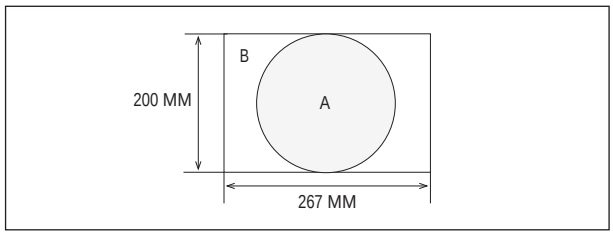


Figure 6-12. Convergence Measurement Areas

6-4-1 Static (Center) Convergence

Static convergence involves alignment of the red, blue and green lines in the center area of the display. See “Dynamic Convergence” for alignment of the color fields around the edges of the display.

CONDITIONS

Direction: Monitor facing east
Warm-up: 30 minutes
Display image: Crosshatch pattern
Tolerances: See Table 6-4

PROCEDURE

As shown in Figure 6-11, the CRT used in these monitors has the same magnet configuration as shown in Table 6-5 below.

Table 6-5. Magnet Order

CRT Manufacturer	Magnet Order from Front of CRT
Toshiba	Convergence bow, 2-pole, 6-pole, 4-pole

Use the following steps to correct any static misconvergence:

1. Make sure the display is not affected by external magnetic fields.
2. Locate the pair of 4-pole magnet rings.
3. Unlock the rings and rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue lines.
4. Rotate the pair of rings (maintaining the spacing between tabs) to converge the horizontal red and blue lines.

5. After completing the red and blue center convergence adjustment, locate the pair of 6-pole magnet rings.
6. Rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue (magenta) and green lines.
7. Rotate the pair of rings (maintaining the spacing between tabs) to converge the horizontal red and blue (magenta) and green lines. Don't rotate the 2-pole magnets as they adjust for color purity.
8. Mark the correct position for the magnets and apply a small line of glue to hold the magnets in place. Lock the rings in place.

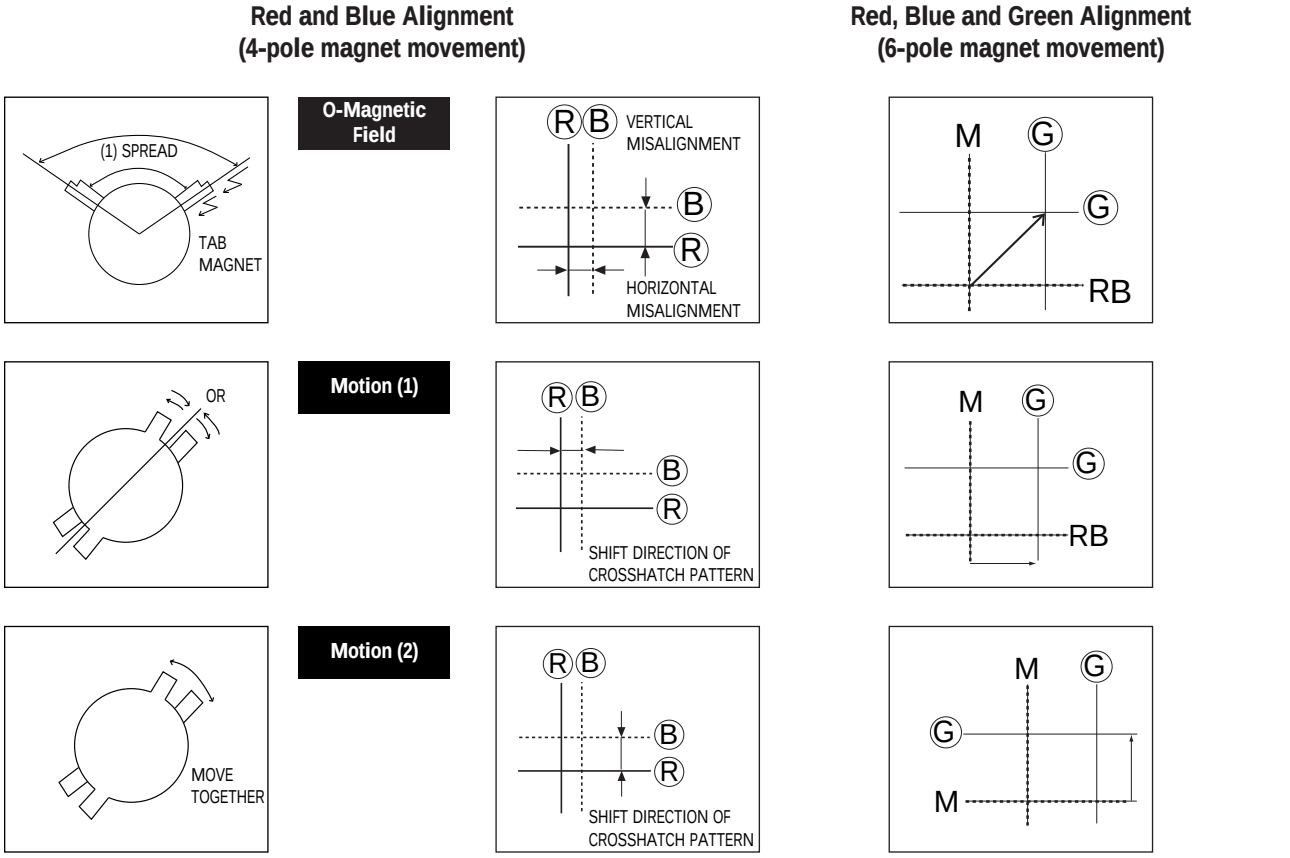
6-4-2 Dynamic (Edge) Convergence

Use the following procedure to correct minor dynamic (edge) misconvergence. If, after using this procedure, dynamic misconvergence around the periphery of the display area is still greater than the tolerance, contact the Regional After Service Center for possible CRT replacement.

1. Make sure the display is not affected by external magnetic fields.
2. Make sure the static convergence is properly adjusted.
3. Strategically place small rubber magnets on the back of the CRT to correct the misconvergence. Be careful not to remove the paper protecting the adhesive on the magnets until you are satisfied with their placement and the dynamic convergence.
4. When you are satisfied with the convergence around the edge of the CRT, permanently glue the magnets to the back of the CRT.

WARNING: Do not remove or change the position of the factory installed wedges. These wedges were installed by the CRT manufacturer and are properly placed for this CRT; their removal may result in damage to the CRT.

Figure 6-13. Magnet Movements



6-4-3 Bow Convergence Adjustments

CONDITIONS

Orientation: Monitor facing east.
Display Image: Crosshatch pattern with mixed RGB colors.
Required tools: Flat-head (–) screwdriver, 1.5 mm
Philips (+) screwdriver, 1.5 mm
Hexkey, 2.5 mm

PROCEDURE

Bow convergence adjustments are not available for the CRTs used in the CKF5607L monitor. While all CRTs have bow convergence magnets, they are sealed in the CRT factory and are not user or service technician adjustable. Do not touch these magnets (see Figure 6-11). If bow convergence adjustment is out of alignment, replace the CRT.

Bow misconvergence should not exceed the values listed in Table 6-4: Misconvergence Tolerances.

6-4-4 Balance Convergence Adjustments

Balance Convergence involves alignment of red and blue lines when they are misaligned at one end more so than at the other end. The Deflection Yoke holds the balance coils which can correct balance misconvergences.

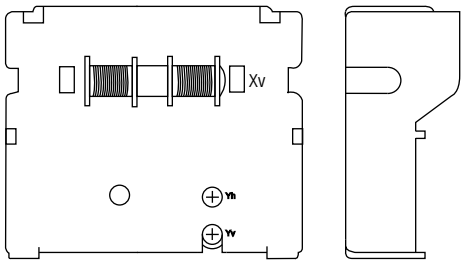


Figure 6-14. SDD Deflection Yoke

6-4-4 (a) HORIZONTAL LINE RED AND BLUE BALANCE CONVERGENCE

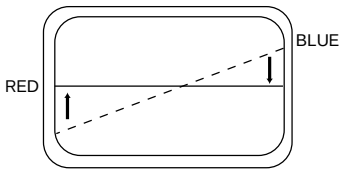


Figure 6-15. Horizontal Line Balance Misconvergence

Use a 2.5 mm hexkey at the Horizontal Balance Coil (Xv). Turning it right raises the right end of the blue line and lowers the left end. Turning the VR to the left lowers the right end of the blue line and raises the left end.

6-4-4 (b) VERTICAL RED AND BLUE BALANCE CONVERGENCE

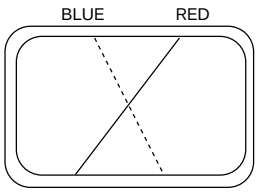


Figure 6-16. Vertical Line Balance Misconvergence

Use a 1.5 mm screwdriver (flat-head [–] for SDD DYs and phillips type [+] for Toshiba DYs) at the YH variable register. Turning the VR left tilts the blue line to the right. Turning it right tilts the blue line to the left.

6-4-4 (c) UPPER AND LOWER HORIZONTAL LINE CONVERGENCE

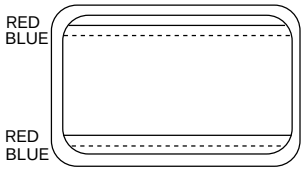


Figure 6-17. Upper and Lower Balance Misconvergence

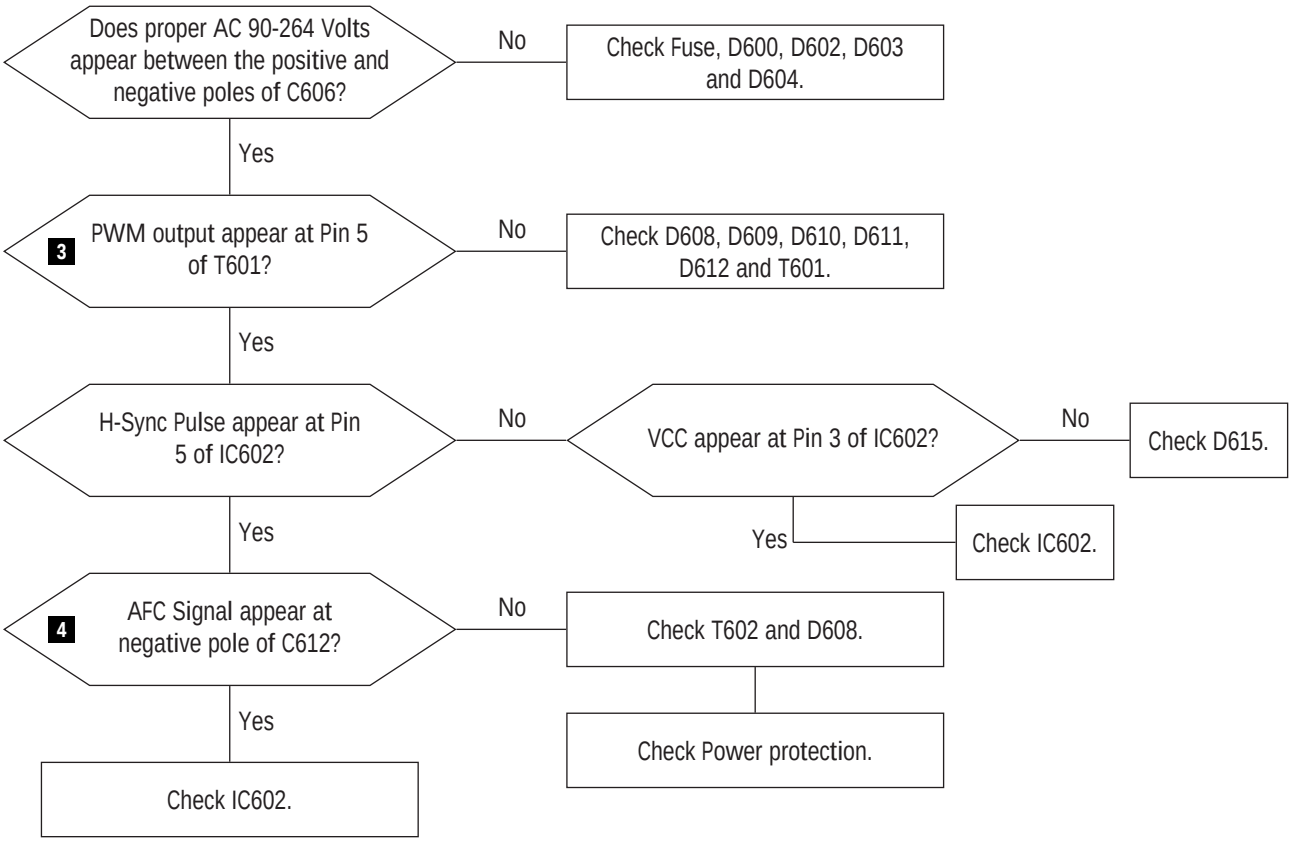
Use a 1.5 mm screwdriver (flat-head [–] for SDD DYs and phillips type [+] for Toshiba DYs) at the Yv variable register. Turning the VR to the left moves the blue line at the top upward and at the bottom, the line moves downward. Turning it right moves the blue line at the top downward and at the bottom, the line moves upward.

7 Troubleshooting

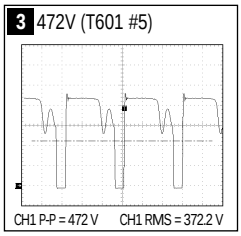
Notes: 1. If a picture does not appear, fully rotate the brightness and contrast controls clockwise and reinspect.

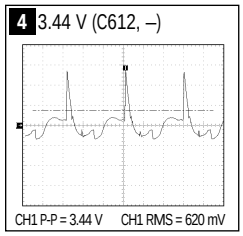
2. Check the following circuits.
   - No raster appears: Power circuit,Horizontal output circuit, H/V control circuit, and H/V output circuit.
   - High voltage develops but no raster appears: Video output circuits.
   - High voltage does not develop: Horizontal output circuits.

7-1 No Power

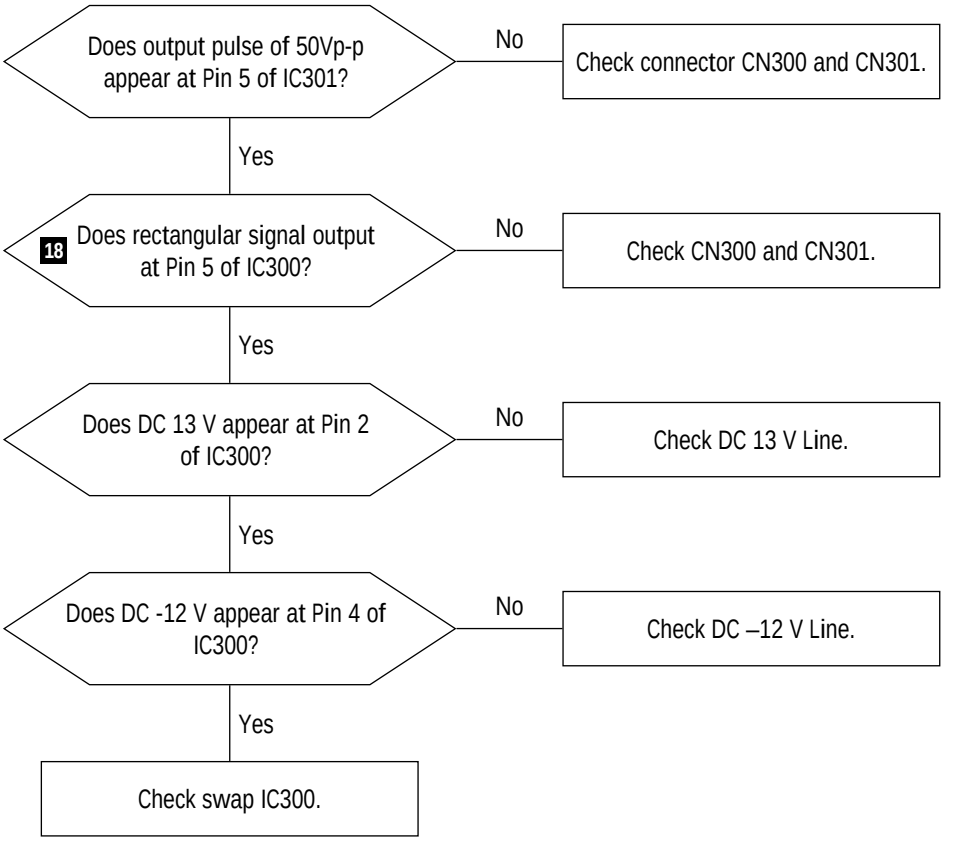


WAVEFORMS

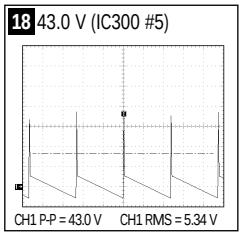




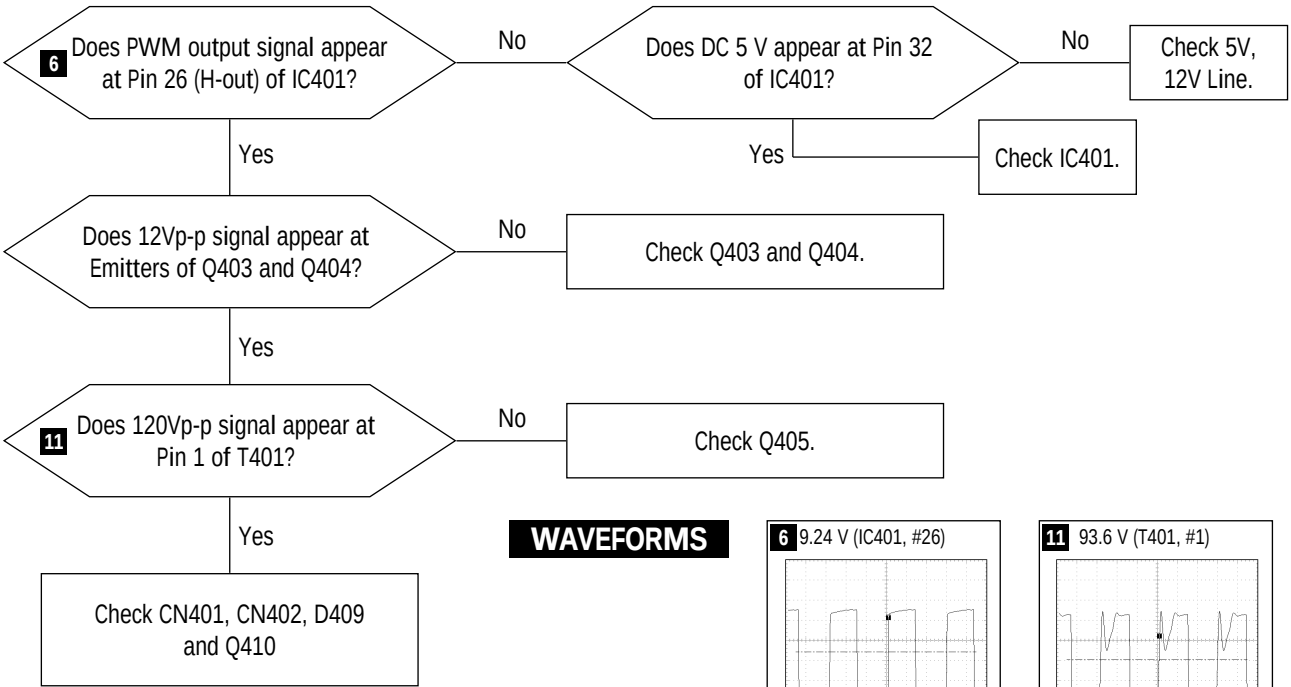
7-2 Horizontal Line on CRT (Root Cause : Vertical Deflection Parts Fail)


Does output pulse of 50Vp-p appear at Pin 5 of IC301?
No
Check connector CN300 and CN301.
Yes
18 Does rectangular signal output at Pin 5 of IC300?
No
Check CN300 and CN301.
Yes
Does DC 13 V appear at Pin 2 of IC300?
No
Check DC 13 V Line.
Yes
Does DC -12 V appear at Pin 4 of IC300?
No
Check DC –12 V Line.
Yes
Check swap IC300.

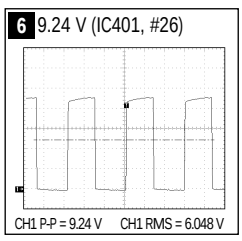
WAVEFORMS

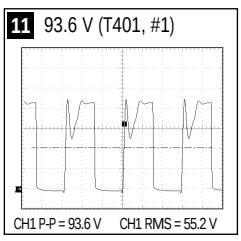


7-3 Vertical Line on CRT (Root Cause : Horizontal Deflection Parts Fail)


6 Does PWM output signal appear at Pin 26 (H-out) of IC401?
No
Does DC 5 V appear at Pin 32 of IC401?
No
Check 5V, 12V Line.
Yes
Check IC401.
Yes
Does 12Vp-p signal appear at Emitters of Q403 and Q404?
No
Check Q403 and Q404.
Yes
11 Does 120Vp-p signal appear at Pin 1 of T401?
No
Check Q405.
Yes
Check CN401, CN402, D409 and Q410

WAVEFORMS





7-4 No Raster (1)

If in a protection case, you must check these case
- Check CN401 and CN402.
- Check Screen VR.
- Check VR501.

Does secondary voltage appear at D608, D609, D610, D611 and D612?
- No → Check Power parts.
- Yes ↓

Does DC 12 V appear at Pin 2 of IC603?
- No → Check protection case.
- Yes ↓

6 Does H-out signal appear at Pin 26 of IC401?
- No → Does DC +5 V, DC +12 V appear at Pins 29, and 32 of IC401?
  - No → Check IC600 and IC603.
  - Yes → Check IC401.
- Yes ↓

Does signal appear at base of Q405?
- No → Check Q403 and Q404.
- Yes ↓

Does signal appear at collector of Q405?
- No → Check Q405.
- Yes ↓

14 Does flyback signal appear at collector of Q410?
- No → Check Q410.
- Yes ↓

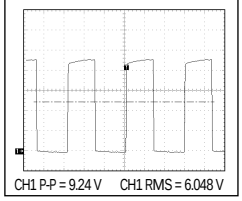
22 23 Does switching pulse appear at base and collector of Q509?
- No → Check Q506, Q507, Q508 and Q509.
- Yes ↓

Does signal appear at gate of Q512?
- No → Check IC501 and FBT.
- Yes ↓

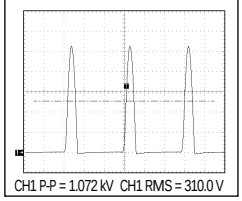
Check Q512, D511, D508 and FBT.

WAVEFORMS

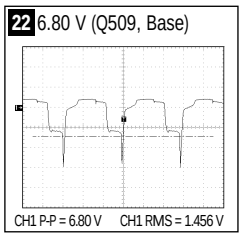
6 9.24 V (IC401, #26)



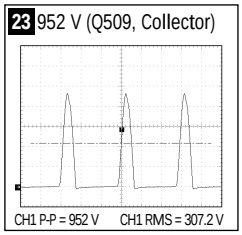
14 1.072 kV (Q410, Collector)



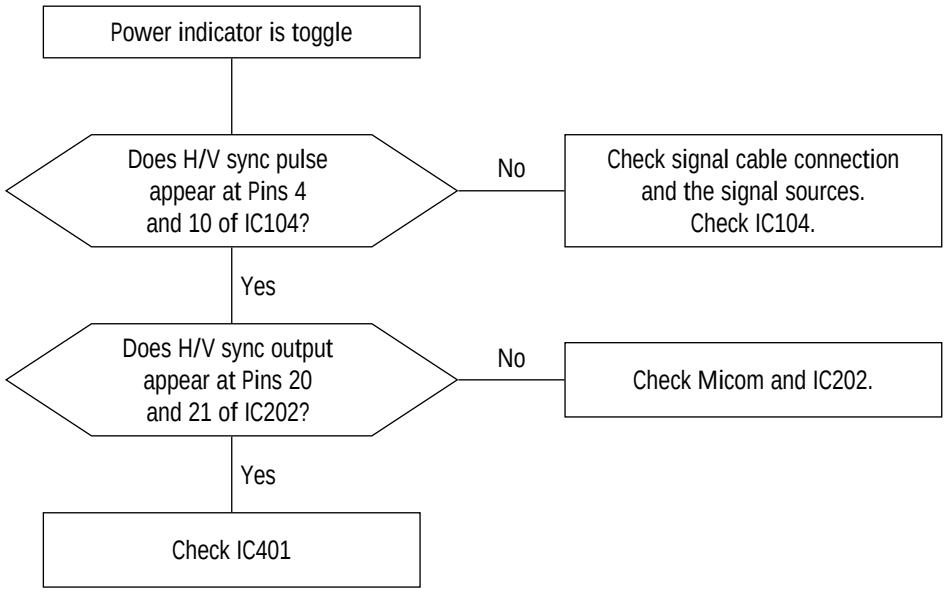
22 6.80 V (Q509, Base)



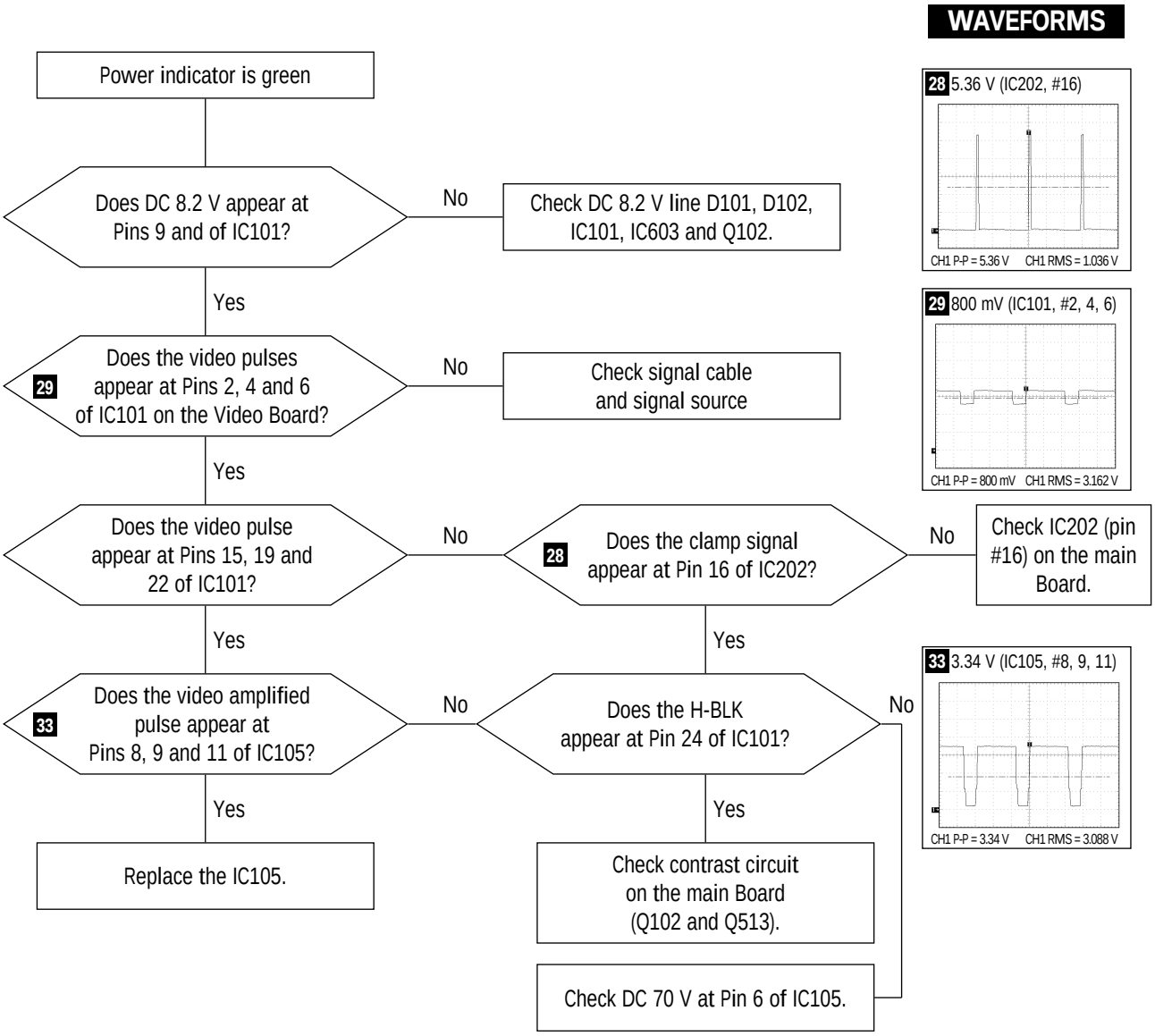
23 952 V (Q509, Collector)



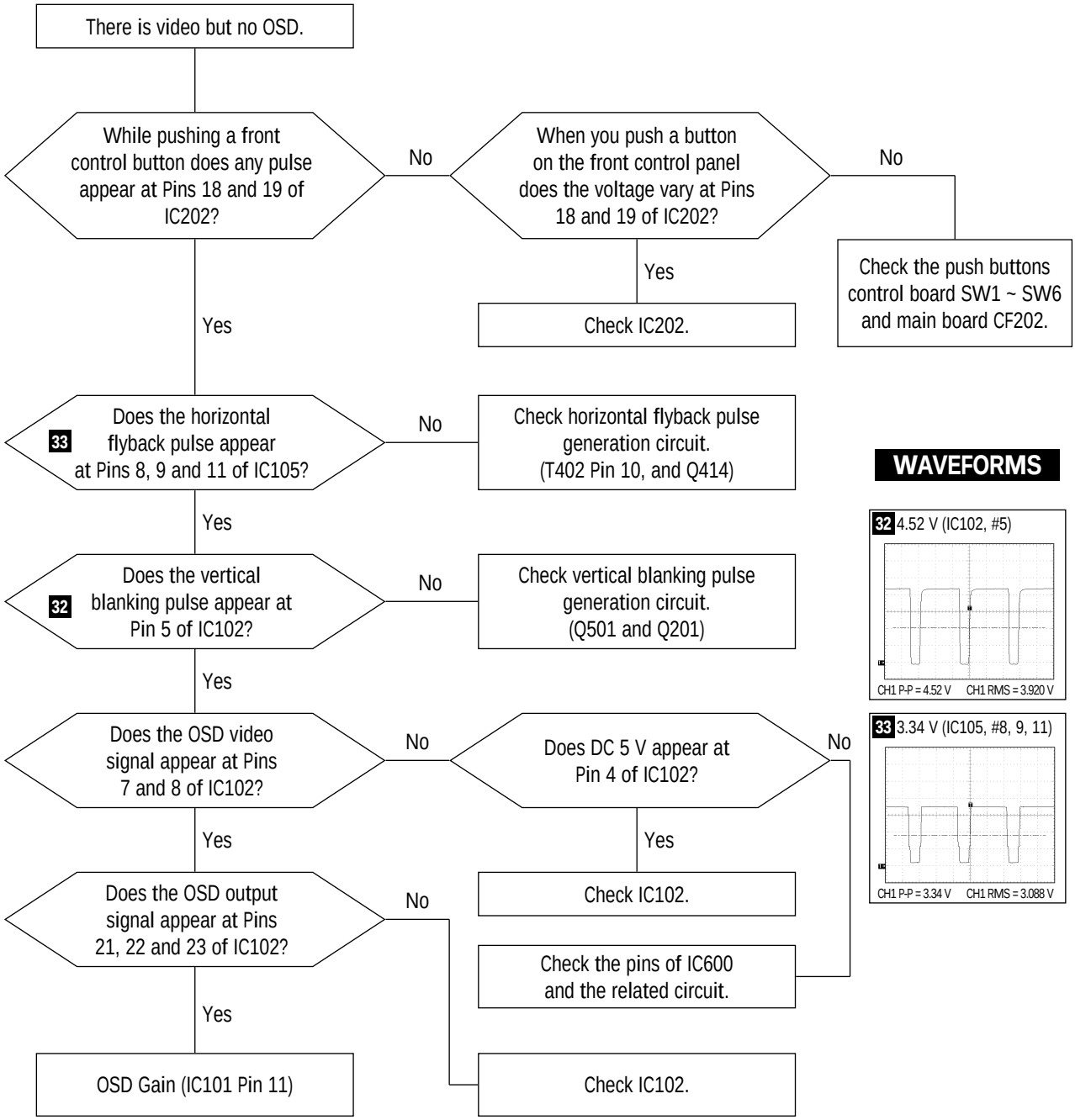
7-5 No Raster (2)


Power indicator is toggle
Does H/V sync pulse appear at Pins 4 and 10 of IC104?
No
Check signal cable connection and the signal sources. Check IC104.
Yes
Does H/V sync output appear at Pins 20 and 21 of IC202?
No
Check Micom and IC202.
Yes
Check IC401

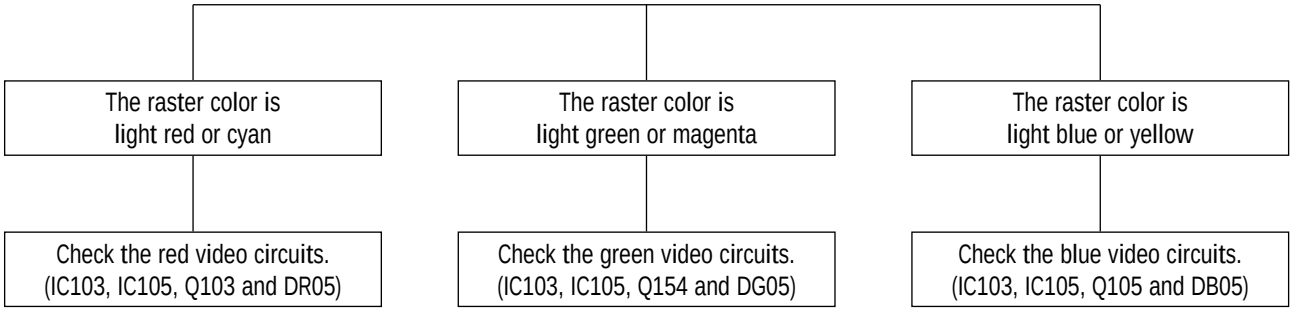
7-6 No Video


WAVEFORMS
Power indicator is green
Does DC 8.2 V appear at Pins 9 and of IC101?
No
Check DC 8.2 V line D101, D102, IC101, IC603 and Q102.
Yes
29
Does the video pulses appear at Pins 2, 4 and 6 of IC101 on the Video Board?
No
Check signal cable and signal source
Yes
Does the video pulse appear at Pins 15, 19 and 22 of IC101?
No
28
Does the clamp signal appear at Pin 16 of IC202?
No
Check IC202 (pin #16) on the main Board.
Yes
Yes
33
Does the video amplified pulse appear at Pins 8, 9 and 11 of IC105?
No
Does the H-BLK appear at Pin 24 of IC101?
No
Yes
Yes
Replace the IC105.
Check contrast circuit on the main Board (Q102 and Q513).
Check DC 70 V at Pin 6 of IC105.
28 5.36 V (IC202, #16)
CH1 P-P = 5.36 V CH1 RMS = 1.036 V
29 800 mV (IC101, #2, 4, 6)
CH1 P-P = 800 mV CH1 RMS = 3.162 V
33 3.34 V (IC105, #8, 9, 11)
CH1 P-P = 3.34 V CH1 RMS = 3.088 V

7-7 No OSD Displays

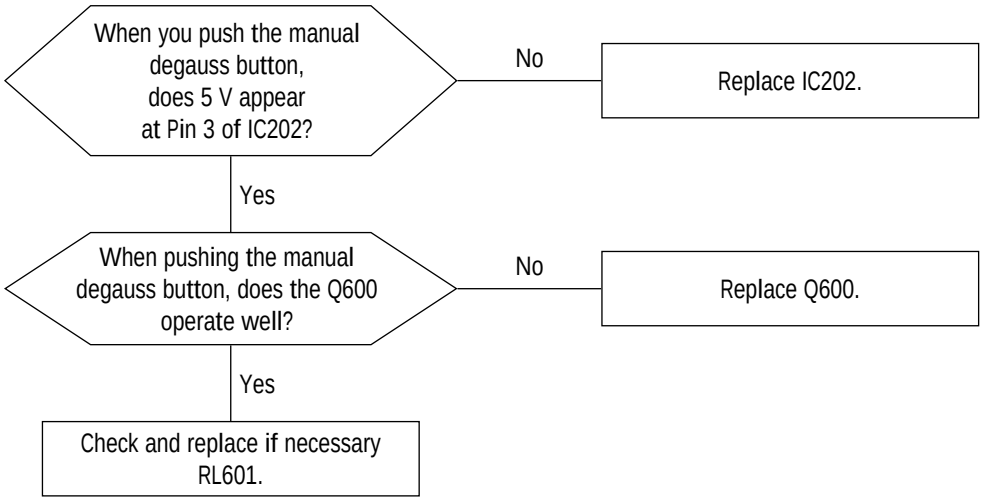

There is video but no OSD.
While pushing a front control button does any pulse appear at Pins 18 and 19 of IC202?
No
When you push a button on the front control panel does the voltage vary at Pins 18 and 19 of IC202?
No
Yes
Check IC202.
Check the push buttons control board SW1 ~ SW6 and main board CF202.
Yes
33 Does the horizontal flyback pulse appear at Pins 8, 9 and 11 of IC105?
No
Check horizontal flyback pulse generation circuit. (T402 Pin 10, and Q414)
Yes
32 Does the vertical blanking pulse appear at Pin 5 of IC102?
No
Check vertical blanking pulse generation circuit. (Q501 and Q201)
Yes
Does the OSD video signal appear at Pins 7 and 8 of IC102?
No
Does DC 5 V appear at Pin 4 of IC102?
No
Yes
Check IC102.
Yes
Does the OSD output signal appear at Pins 21, 22 and 23 of IC102?
No
Check the pins of IC600 and the related circuit.
Yes
OSD Gain (IC101 Pin 11)
Check IC102.
WAVEFORMS
32 4.52 V (IC102, #5)
CH1 P-P = 4.52 V CH1 RMS = 3.920 V
33 3.34 V (IC105, #8, 9, 11)
CH1 P-P = 3.34 V CH1 RMS = 3.088 V

7-8 No Specific Color Appears


The raster color is light red or cyan
The raster color is light green or magenta
The raster color is light blue or yellow
Check the red video circuits. (IC103, IC105, Q103 and DR05)
Check the green video circuits. (IC103, IC105, Q154 and DG05)
Check the blue video circuits. (IC103, IC105, Q105 and DB05)

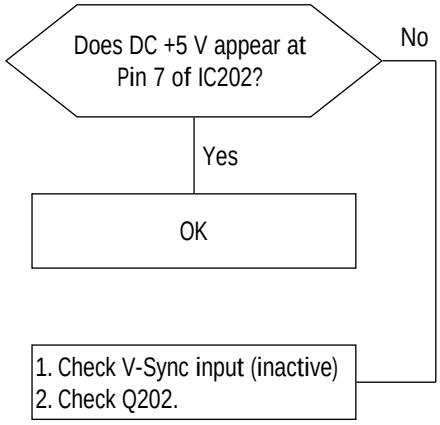
Note: Removing the signal cable displays a self raster screen. This screen displays the message "check signal cable" along with red, green and blue boxes. Use these boxes to check whether each individual color (R, G, B) is operating or not.

7-9 Degauss Operation Failure

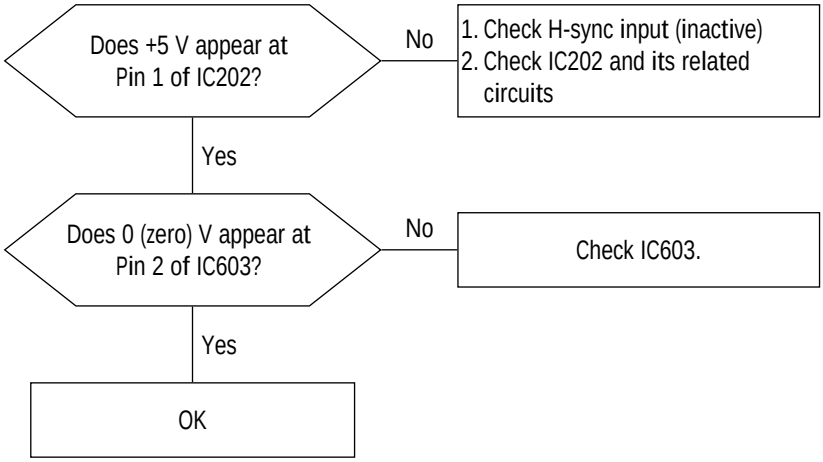

When you push the manual degauss button, does 5 V appear at Pin 3 of IC202?
No
Replace IC202.
Yes
When pushing the manual degauss button, does the Q600 operate well?
No
Replace Q600.
Yes
Check and replace if necessary RL601.

7-10 Power Save Management System Failure

7-10-1 Stand-By Mode



7-10-2 Suspend Mode



7-10-3 Off Mode

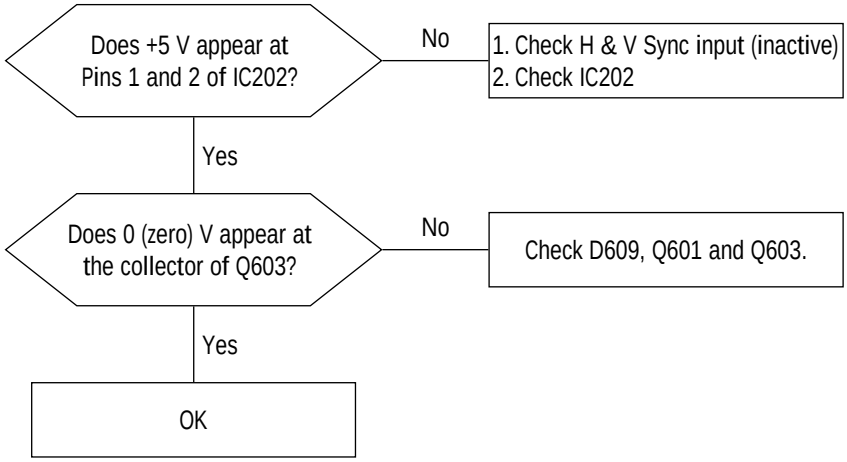
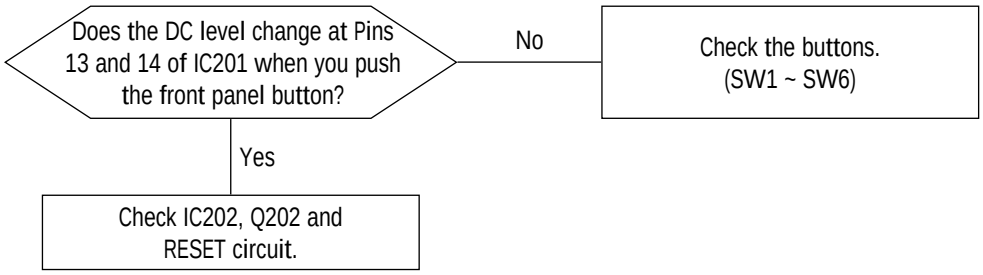

Does +5 V appear at Pins 1 and 2 of IC202?
No
1. Check H & V Sync input (inactive)
2. Check IC202
Yes
Does 0 (zero) V appear at the collector of Q603?
No
Check D609, Q601 and Q603.
Yes
OK

Table 7-1. DPMS Logic Table

Mode	Sync		Video	LED Color
	H	V		
Normal	Active	Active	Active	Green
Stand-By	Inactive	Active	Blank	Amber
Suspend	Active	Inactive	Blank	Green/Amber blinking
Off	Inactive	Inactive	Blank	Amber blinking

Note: If the signal cable is removed, DPMS function does not operate and a self raster displays.

7-11 User Controls Don't Work


Does the DC level change at Pins 13 and 14 of IC201 when you push the front panel button?
No
Check the buttons. (SW1 ~ SW6)
Yes
Check IC202, Q202 and RESET circuit.

Memo

9 Electrical Parts List

9-1 Main PCB Parts

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
BD1	24.4	141.2	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD200	63.9	80.9	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD401	77.1	137.8	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD402	39.2	123.6	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD403	24.4	141.2	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD404	186.4	233.4	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD405	176.4	125.7	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD501	159.7	130.4	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD600	187.5	107	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD601	132.8	105.5	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD602	189.5	44.9	3301-000012	CORE-FERRITE BEAD	AA,3.5x1x9mm,1000,3000G	
C151	86.4	34.4	2201-000680	C-CERAMIC,DISC	82pF,5%,50V,NPO,8x3.5,5,TP	
C152	96.6	23.7	2301-000011	C-FILM,PEF	1nF,5%,100V,10.5x12.5x6.5,5mm	
C153			2202-002009	CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C200	58.8	21.2	2401-000030	C-AL	22uF,20%,25V,GP,5x11mm,5mm,TP	
C201	72.8	27.1	2401-000027	(T)50V 4.7M	CAP-AL.ELEC,475M,1H	
C202	24.6	29.2	2401-000010	C-AL	220uF,20%,16V,GP,6.3x11mm,2.5m	
C203	60.5	105.2	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C204	61.7	98.1	2201-000138	C-CERAMIC,DISC	100pF,10%,50V,Y5P,4.0X4.0,2.5	
C205	309.2	101.2	2401-000029	C-AL	10uF,20%,100V,GP,8x11.5mm,5mm	
C206	295.6	109.1	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C207	311.4	124.7	2401-000030	C-AL	22uF,20%,25V,GP,5x11mm,5mm,TP	
C208	35.8	57.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C209	54.3	79	2401-000027	(T)50V 4.7M	CAP-AL.ELEC,475M,1H	
C210	60.3	56.9	2401-000027	(T)50V 4.7M	CAP-AL.ELEC,475M,1H	
C211	50.5	23.2	2201-000197	C-CERAMIC,DISC	10pF,0.5pF,50V,NPO,4x3.5,5,TP	
C213			2401-000027	CAP-AL.ELEC,475M,1H	(T)50V 4.7M	
C214			2202-002009	CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C215			2201-000197	CERAMIC,DISC,	10pF,0.5pF,50V,NPO,4x3.5,5,TP	
C301	116.1	101.3	2401-000037	(T)470UF,16V,20%,R-RADIAL	CAP-AL.ELEC,477M,1C,8x11.5	
C302	121.8	46.3	2401-000849	(T)35V 220M	CAP-AL.ELEC,227M,1V	
C303	96.4	59.8	2301-000257	C-FILM,PEF	4.7nF,10%,100V,5.8x12.5mm,5mm	
C304	120.5	65.2	2305-000004	C-FILM,MPEF	220nF,10%,100V,12.7x16,5mm,TP	
C305	81.2	55.7	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C306	91	57.4	2201-000013	CAP-CERAMIC,471K,1H,Y5P	470PF,50V,10%,10%,Y5P,DISC-RADI	
C307	122.8	104	2401-000023	CAP-AL.ELEC,105M,1H	(T)50V 1M	
C401	66.7	136.6	2401-000037	CAP-AL.ELEC,477M	(T)470UF,16V,20%,1C,8x11.5,R-RADIAL	
C402	67	143.8	2401-000025	CAP-AL.ELEC,107M,1C	(T)16V 100M	
C403	64.5	121.5	2201-000009	C-CERAMIC,DISC	22pF,5%,50V,NPO,4x3.5,5,TP	
C404	56.3	121.4	2201-000009	C-CERAMIC,DISC	22pF,5%,50V,NPO,4x3.5,5,TP	
C405	43.1	139.3	2301-000168	C-FILM,PEF	150nF,5%,100V,11.5x19mm,7.5mm	
C406	28.5	134.3	2401-000031	(T)16V 47M	CAP-AL.ELEC,476M,1C	
C407	33	140.5	2305-000001	C-FILM,MPEF	470nF,10%,63V,6.0X15.5X7.5,5mm	
C408	66.3	161.6	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
C409	58.2	164.2	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C411	54.4	169.2	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C412	48.2	169.2	2305-000291	C-FILM,MPEF	220nF,5%,63V,7.5x13.5mm,5mm,TP	
C413	51.6	176.5	2401-000027	(T)50V 4.7M	CAP-AL.ELEC,475M,1H	
C414	35.4	164	2305-000291	C-FILM,MPEF	220nF,5%,63V,7.5x13.5mm,5mm,TP	
C415	39	164.6	2401-000023	(T)50V 1M	CAP-AL.ELEC,105M,1H	
C416	39.2	160.6	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C417	42.8	174.3	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C418	28.6	154.3	2301-000011	C-FILM,PEF	1nF,5%,100V,10.5x12.5x6.5,5mm	
C419	18	157	2401-001016	C-AL	3.3uF,20%,50V,BP,6x11mm,5mm,TP	
C420	29.8	170.4	2301-000012	C-FILM,PEF	2.2nF,5%,100V,10.5x12.5x6.5,5m	
C421	37.5	157.8	2301-000107	C-FILM,PEF	1.5nF,5%,100V,6.5x3.0x5.5mm,5m	
C423	91	134.6	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C424	101.2	164	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C425	112.1	168.3	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C426	129.2	162.7	2301-000010	(T)100V 104J	CAP-MYLAR,104J,2A,5P	
C427	169.8	170.6	2305-000231	(T)63V 105K	CAP-MPETP,105K,1J,5P	
C428	50.2	195.5	2401-000031	(T)16V 47M	CAP-AL.ELEC,476M,1C	
C429	64.7	195.5	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C430	19.2	226.9	2306-000119	C-FILM,MPPF	100nF,5%,250V,21.5x11mm,7.5mm	
C431	108.9	224.6	2201-000291	CAP-CERAMIC,102K,2H,Y5P	1NF,500V,20%,10%,Y5P,DISC-RADIA	
C432	48.4	217.9	2306-000171	C-FILM,MPPF	270nF,5%,250V,21.5x12.5mm,7.5m	
C433	92.4	208.4	2306-000131	C-FILM,MPPF	150nF,5%,250V,21.5x11mm,7.5mm	
C434	59.7	220.8	2306-000197	C-FILM,MPPF	390nF,5%,250V,20*19*12,7.5mm,T	
C435	28.4	234.3	2306-000119	C-FILM,MPPF	100nF,5%,250V,21.5x11mm,7.5mm	
C436	37.7	234.3	2306-000125	C-FILM,MPPF	100nF,5%,250V,21.5x11mm,7.5mm	
C437	159.1	217.8	2201-000291	CAP-CERAMIC,102K,2H,Y5P	1NF,500V,20%,10%,Y5P,DISC-RADIA	
C438	163.2	227.6	2303-001023	C-FILM,PPF	2.2nF,5%,2.5KV,23x13x19,7.5mm	⚠
C439	173.2	227.6	2303-000145	C-FILM,PPF	1nF,10%,2KV,23x13mm,7.5mm,TP	⚠
C440	100.7	232.4	2306-000137	CAP-MPPF,184J,2E,7.5P	180NF,250V 5%,RE-RADIAL	
C441	106.7	191	2401-000887	C-AL	220uF,20%,63V,GP,10x20mm,5mm,T	
C442	135.4	206.6	2306-000007	C-FILM,MPEF	470nF,5%,250V,21.5X13.0X7.9,17	
C443	44.8	180.5	2301-000017	C-FILM,PEF	33nF,10%,100V,7.5x12.5mm,5mm,T	
C444	229	113.1	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C445	249.4	107.4	2201-000010	C-CERAMIC,DISC	33pF,5%,50V,NPO,5x3.5,5,TP	
C448	100	202.1	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C449			2301-000010	(T)100V 104J	CAP-MYLAR,104J,2A,5P	
C450			2401-000030	C-AL	22uF,20%,25V,GP,5x11mm,2mm,TP	
C457	49.4	160.3	2202-002021	C-CERAMIC,MLC-AXIAL	1nF,5%,50V,NPO,TP,5.1x6.4x3.2	
C501	254.8	128.7	2201-000013	CAP-CERAMIC,471K,1H,Y5P	470PF,50V,10%,10%,Y5P,DISC-RADI	
C502	282	176	2401-000966	C-AL	22uF,20%,50V,GP,6.3x11mm,5mm,T	
C503	222.7	133.3	2401-000032	(T)50V 100M	CAP-AL.ELEC,107M,1H	
C504	272.8	143.2	2303-000145	C-FILM,PPF	1nF,10%,2KV,23x13mm,7.5mm,TP	⚠
C505	231.4	141.8	2306-000007	C-FILM,MPEF	470nF,5%,250V,21.5X13.0X7.9,17	
C506	281.9	225.2	2401-000638	C-AL	2.2uF,20%,350V,WT,10x12.5mm,5m	
C507	267.4	161.1	2401-000026	(T)50V 3.3M	CAP-AL.ELEC,335M,1H	
C508	288.5	213.8	2201-000285	C-CERAMIC,DISC	1nF,10%,1KV,Y5P,8.0X4.0,5,TP	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
C509	133.4	229.7	2303-000002	C-FILM,PPF	8.2nF,5%,400V,7.5mm,T	
C510	169.6	149.4	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.5x4.3	
C511	161.7	146.2	2301-000011	C-FILM,PEF	1nF,5%,100V,10.5x12.5x6.5,5mm	
C512	143	132.2	2301-000014	C-FILM,PEF	6.8nF,5%,100V,7.3X11X3,5mm,TP	
C513	152.3	132.7	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M,1E	
C514	156.6	136.9	2401-000324	C-AL	100uF,20%,35V,GP,6.3x11mm,5mm	
C515	134.4	132.1	2305-000280	C-FILM,PEF	220NF, 10%, 63V,7.5X13.5mm,5mm,T	
C516	121.8	143.2	2401-000031	(T)16V 47M	CAP-AL.ELEC,476M,1C	
C517	124.3	154.7	2305-000138	C-FILM,MPEF	100nF,10%,63V,7.5x12.5mm,5mm,T	
C518	119.2	149.2	2401-000586	C-AL	1uF,20%,50V,BP,6x11mm,5mm,TP	
C519	212.9	140	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C520	211.2	133.6	2401-000887	C-AL	220uF,20%,63V,GP,10x20mm,5mm,T	
C521	264.8	132.4	2401-000025	(T)16V 100M,	CAP-AL.ELEC,107M,1C	
C522			2301-000014	C-FILM,PEF	6.8nF,5%,100V,5.8x12.5mm,5mm,T	
C523	301	183	2301-001027	C-FILM,PEF	15nF,10%,250V,9.5x12x4.5,5mm,T	
C524	292.2	219.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C525	308	217.3	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C526	95.7	135.4	2401-001258	C-AL	4.7uF,20%,35V,WT,5x11mm,5mm,TP	
C527	114.7	139.4	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C601	306.3	34.1	2201-000008	C-CERAMIC,DISC	1nF,20%,250VAC,Y5U,16x7,7.5	⚠
C602	302.1	46.3	2201-000008	C-CERAMIC,DISC	1nF,20%,250VAC,Y5U,16x7,7.5	⚠
C603	294	66.4	2201-000023	C-CERAMIC,DISC	2.2nF,20%,125V,Y5U,11x7,5,TP	⚠
C604	301.9	60.3	2201-000023	C-CERAMIC,DISC	2.2nF,20%,125V,Y5U,11x7,5,TP	⚠
C605	262.8	51	2501-000203	CAP-MPAPER,474K,250VAC	470NF,250VAC,10%,X2,RE-RAD,25.4	⚠
C606	233	71.6	2401-000052	CAP-AL.ELE,227M,2G,30X35	(B)220UF,400V,20%,R-RADIAL,TERM	⚠
C607	190.9	35.7	2201-000019	C-CERAMIC,DISC	10nF,+80-20%,500V,Y5V,10x4,5,T	
C608	189.9	15.8	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C609	206.5	40.9	2201-000012	C-CERAMIC,DISC	220pF,10%,1KV,Y5P,6.3x5,5,TP	
C610	198.5	56	2401-001195	C-AL	33uF,20%,50V,GP,8x11.5mm,5mm,T	
C611	183.2	13.7	2201-000330	C-CERAMIC,DISC	2.2nF,20%,250VAC,Y5P,9x5,7.5,B	⚠
C612	203	68.3	2401-000023	(T)50V 1M	CAP-AL.ELEC,105M,1H	
C613	194.7	63.6	2301-000010	(T)100V 104J	CAP-MYLAR,104J,2A,5P	
C614	139.9	90	2401-000039	CAP-AL.ELEC,108M	(T)1000UF,16V,20%.1C,10x16,R-RADIAL	
C615	95.6	178.9	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C616	160.7	85.9	2401-000039	CAP-AL.ELEC,108M	(T)1000UF,16V,20%.1C,10x16,R-RADIAL	
C617	131.7	51.4	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C618	132.9	74.2	2401-001869	C-AL	100uF,20%,100V,GP,13x20mm,5mm	
C619	124.4	29.5	2401-000039	CAP-AL.ELEC,108M	(T)1000UF,16V,20%.1C,10x16,R-RADIAL	
C620	132.5	37.5	2201-000014	C-CERAMIC,DISC	330pF,10%,1KV,Y5P,6x3.5,5,TP	
C621	137.2	58.9	2401-000540	CAP-AL.ELEC,157M	(T)150UF,63V,20%.1J,10X20,R-RADIAL	
C622	86.3	78.9	2401-000041	C-AL	220uF,20%,16V,GP,10x12.5mm,5mm	
C623	150.3	14.1	2301-000011	C-FILM,PEF	1nF,5%,100V,10.5x12.5x6.5,5mm	
C624	140.9	17.3	2301-000287	(T)100V 562J	CAP-MYLAR,562J,2A,5P	
C625			2305-000280	C-FILM,PEF	220NF, 10%, 63V,7.5X13.5mm,5mm,T	
C626			2301-000013	C-FILM,PEF	4.7nF,5%,100V,10.5x12.5x6.5,5m	
C627			2201-000291	CAP-CERAMIC,102K,2H,Y5P	1NF,500V,20%,10%,Y5P,DISC-RADIA	
C628			2201-000291	CAP-CERAMIC,102K,2H,Y5P	1NF,500V,20%,10%,Y5P,DISC-RADIA	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
CB10	308.7	213.8	2201-000651	C-CERAMIC,DISC	68pF,5%,50V,NPO,8x3,5,TP	
CF102	321.4	188.8	3711-000044	CONNECTOR-HEADER	BOX,6P,1R,2.5mm,STRAIGHT,SN	
CF202			3711-000694	CONNECTOR-HEADER	BOX,14P,1R,2.50mm,STRAIGHT,SN	
CG10	308.7	200.7	2201-000651	C-CERAMIC,DISC	68pF,5%,50V,NPO,8x3,5,TP	
CN1	308.7	200.7	3711-003232	CONNECTOR-HEADER	BOX,4P,1R,2MM,ANGLE,SN	
CN2			3711-003230	CONNECTOR-HEADER	BOX,3P,1R,2mm,ANGLE,SN	
CN201			3711-000999	CONNECTOR-HEADER	BOX,5P,1R,2.50mm,STRAIGHT,SN	
CN300			BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN301	172.6	218	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN401	172.6	202	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	⚠
CN402	172.6	192	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN403			3711-000024	CONNECTOR-HEADER	BOX,3P,1R,2.5mm,STRAIGHT,SN	TCO
CN600	304	85.6	3711-000217	CONNECTOR-HEADER	1WALL,3P,1R,3.96mm,STRAIGHT,SN	
CN601	243.8	56.2	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN602	236.4	56.2	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN603	313.3	38.5	3721-001006	PLUG-AC POWER	3P,10/24mm,SN	
CN606			3711-000178	CONNECTOR-HEADER	1WALL,2P,1R,3.96MM,STRAIGHT,SN	TCO
CR01	308.5	187.7	2201-000651	C-CERAMIC,DISC	68pF,5%,50V,NPO,8x3,5,TP	
D02			0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D1	308.5	187.7	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D121	307.3	211	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D122	315.3	208.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D123	307.3	198	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D124	315.3	195.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D125	307.3	185	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D126	315.3	182.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D128	308	150.9	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D129	310.3	150.9	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D130	305.6	150.9	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D131	303	150.9	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D2			0401-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D201	308.4	122.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D202	28.4	104.6	0403-000003	DIODE-ZENER	UZ8.2BL,8.2V,7.7-8.2V,500mW,DO	
D203			0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D204			0403-000004	DIODE-ZENER	UZ7.5BM,12V,11.74-12.35V,500mW,DO	
D205			0403-000004	DIODE-ZENER	UZ7.5BM,12V,11.74-12.35V,500mW,DO	
D303	110.5	55	0402-000128	DIODE-REC,1N4002,DO-41	70V,1A,1.1V,1A,2000NS,0.5A	
D401	79.9	184.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D402	81.6	234.8	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D403	92.6	228	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D404	162.6	178.6	0402-001131	DIODE-RECTIFIER	UG1B,100V,1A,DO-204AL,TP	
D405	112.8	209.5	0402-000274	400V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4004,DO-41	
D407	63.9	181.6	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D408	34.8	168.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D409	186	217.1	0402-001046	DIODE-RECTIFIER	1500V,10A,TO220F,ST	
D501	296.2	168.9	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D503	299.5	201.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
D504	305.9	222.9	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D505	273.8	164.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D507	103	139.9	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D508	92.8	151.2	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D510	265.8	171	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D511	216.9	146.7	0402-000274	400V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4004,DO-41	
D512	274.1	213.6	0402-000007	DIODE-RECTIFIER	1N4937GP,600V,1A,DO-41	
D513	155.6	143.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D514	166.3	132.2	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D515	138.9	149.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D516	133.8	150.4	0403-000355	DIODE-ZENER	UZ5.1BSB,5.1V,4.97-5.18V,500mW	
D517	186.5	133.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D519			0403-000355	DIODE-ZENER	UZ5.1BSB,5.1V,4.97-5.18V,500mW	
D520			0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D600	265.2	72.8	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	
D601	248.7	92.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D602	250.2	78.1	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	
D603	246.9	66.5	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	
D604	265	61.3	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	
D605	215.3	32	0402-000007	DIODE-RECTIFIER	1N4937GP,600V,1A,DO-41	
D606	207.3	70.4	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D607	201.2	40.1	0402-000012	DIODE-RECTIFIER	UF4007,1KV,1A,DO-41	
D608	149.6	71.2	0402-000014	DIODE-RECTIFIER	RG2,400V,1.2A,DO-201	
D609	155.5	72	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D610	152.2	42.3	0402-000005	DIODE-RECTIFIER	31DF4,400V,3A,DO-201AD	
D611	152.2	37.5	0402-000012	DIODE-RECTIFIER	UF4007,1KV,1A,DO-41	
D612	133.5	26.4	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D615	189.3	56.4	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D616			0403-000351	DIODE-ZENER	UZ4.7B,4.7V,4.4-5.0V,500mW,DO-	
D617			0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DS101	316	144.1	3701-000003	CONNECTOR-DSUB	15P,3R,FEMALE,ANGLE,AUF	
FG1	313.2	52.5	3601-000004	FUSE-FERRULE	250V,3.15A,SLOW BLOW,CERAMIC,5	
FH1	290.8	33.9	3602-000001	800GF,400-800GF	FUSE-CLIP,5.2X20,30MOHM	
H3	200.5	85.8	6042-000001	EYELET	EYELET 2.2 HOLE 3.0 PAD 5.0	
HS102	329.8	148.7	BH70-10345A	SHIELD-D_SUB	CSQ4327,SPTE,T0.5,DEGRE,-	
HS300	124.3	85.3	BH62-30415A	HEAT/SINK	A1050S,T2.0,CKB5237	
HS501	188.3	236.9	BH62-30416A	HEAT/SINK-FBT	A1050S,T1.0,CKB7227	
HS602	212.5	48.9	BH62-30018B	HEAT/SINK-TR	A1050S,T3,CQA4147	
IC104			0801-000337	IC-CMOS LOGIC	74HCT14,SCHIMITT INVERTER,DIP	⚠
IC202	60.7	49.8	BH09-10304F	IC-MICOM MASKING	CKF5607,72752J4B1/LAN CKF_02,5	⚠
IC204	50.4	100.6	1103-001009	IC-EEPROM	24LC21,128X8BIT,DIP,8P,300MIL	⚠
IC205	45.8	76.6	1103-001020	IC-EEPROM	24LC04,4Kx8BIT,DIP,8P,300MIL	⚠
IC300	96.5	51.8	1204-000013	IC-CONSUMER/CIRCUIT	9302,TO-220,7P,15V/30V,VERTIC	⚠
IC401			1204-001231	IC-DEF. PROCESSOR	TDA9109,DIP,32P,300MIL,PLASTIC	⚠
IC501	133	138.1	1203-000182	IC-POSI.ADJUST REG.	494,DIP,16P,300MIL,PLASTIC	
IC502	95.9	151.2	1201-000420	IC-OP AMP	358,DIP,8P,300MIL,DUAL,100V/mV	⚠
IC600	90.3	92.8	1203-000001	IC-POSI.ADJUST REG.	7805,TO-220,3P,PLASTIC,4.8/5	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
IC601	154.4	20.6	1203-000002	TO-92,3,36V(T)-SIMPLE	IC-LIN,431,REGULATOR	
IC602	220.6	43.5	BH13-10335J	IC-HYBRID	CKA5227,KA2S0680,SIP,5P,FET+CO	⚠ ⚠
IC603	106.1	100.9	1203-000165	TO-220,4,5V	IC-LIN,KA78R12,REGULATOR	
L401	72.8	121.7	2701-000154	INDUCTOR-AXIAL	220uH,10%,4.2x9.8mm	
L402	62.3	161.8	2701-000154	INDUCTOR-AXIAL	220uH,10%,4.2x9.8mm	
L403	116.4	219.6	BH27-20344J	COIL-CHOKE	30.OUH,10%,DR8*8,TAPING	
L404	142.5	233.1	BH27-20344T	COIL-H.LINEARITY	8.6UH,20%,DR14*15,BULK	
L405	119.4	193	BH27-20310H	COIL-CHOKE	0.18OHM,16.7*27.8,B,USTC0.	
L406	68.7	230.9	BH27-20343M	COIL-PEAKING	750UH,10%,DR8*8,TAPING	
L407	121.7	225.6	BH27-20343H	COIL-PEAKING	2.7MH,10%,DR8*8,TP	
L501	195.5	126.5	BH27-20342V	COIL-CHOKE	200UH,15%,DR14*20,BULK	
L600	287.1	70.2	BH27-20344G	COIL-LINE FILTER	1.5MH,20%,SQ-2114,BULK	
L602	279.4	42.8	BH26-30008A	TRANS-LINE FILTER	15MH,8P,EE,SB-5S,15MH,EE-222	⚠
OP1	279.4	42.8	0601-001047	LED	ROUND,GRN/YEL,2mm,585nm	
OP601	167.7	15.5	0604-001018	PHOTO-COUPLE	DAR-TR, 63-125%, 200mW, DIP-4, RST	⚠
Q201	307.8	119.4	0501-000389	TR-SMALL SIGNAL	KSC815,NPN,400mW,TO-92,TP,120-	
Q202	68.1	19.1	0501-000389	TR-SMALL SIGNAL	KSC815,NPN,400mW,TO-92,TP,120-	
Q203	12	103.8	0501-000389	TR-SMALL SIGNAL	KSC815,NPN,400mW,TO-92,TP,120-	
Q204	12.6	90.9	0501-000303	0.25W,-60V,-50V,-5V,-0.15A	TR-PNP,KSA733,TO-92,EBC	
Q401	33.7	174.9	0501-000303	0.25W,-60V,-50V,-5V,-0.15A	TR-PNP,KSA733,TO-92,EBC	
Q403	87.6	163.4	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q404	94.7	163.4	0501-000581	0.625W,40V,40V,5V,0.2A	TR-PNP,2N3906,TO-92,EBC	
Q405			0501-000412	TR-SMALL SIGNAL	KSP42,NPN,625mW,TO-92,40	
Q406	25	211.7	0505-001102	FET-SILICON	IRFR/U230A,N,200V,7.5A,400mohm	
Q407	36.9	211.7	0505-001102	FET-SILICON	IRFR/U230A,N,200V,7.5A,400mohm	
Q408	51.8	211.7	0505-001129	FET-SILICON	IRF630A,N,200V,10uA,400mohm,72	
Q409	57.7	190.6	0501-000389	TR-SMALL SIGNAL	KSC815,NPN,400mW,TO-92,TP,120-	
Q410			0502-001001	TR-POWER	KSC5088,NPN,1500V,1500V,8A,50W	⚠
Q411	72.9	193.5	0501-000581	0.625W,40V,40V,5V,0.2A	TR-PNP,2N3906,TO-92,EBC	
Q412	78	193.5	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q413	105.8	203.7	0505-001129	FET-SILICON	IRF630A,N,200V,10uA,400mohm,72	⚠
Q414	286.3	109.6	0501-000492	40V,15V,5V,0.3A	TR-NPN,MPS3646,TO-92,EBC	
Q501	285.3	186.1	0501-000389	TR-SMALL SIGNAL	KSC815,NPN,400mW,TO-92,TP,120-	
Q502	303.4	215.3	0501-000586	TR-SMALL SIGNAL	KSC945-Y,NPN,250mW,TO-92,TP,12	
Q503	295.5	219.1	0501-000143	TR-SMALL SIGNAL	2N6520,PNP,625mW,TO-92,30-20	
Q505	107.4	169.9	0501-000303	0.25W,-60V,-50V,-5V,-0.15A	TR-PNP,KSA733,TO-92,EBC	
Q506	246.5	130.9	0501-000404	TR-SMALL SIGNAL	KSD1616-Y,NPN,750mW,TO-92,TP,1	
Q507	246.2	135	0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	
Q508	260.8	139	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q509	246.1	146.2	0502-001070	TR-POWER	2SC5339,NPN,50W,TO-3PF,ST,4-8	⚠
Q510	184.2	175.7	0501-000483	0.625W,75V,40V,6V,0.6A	TR-NPN,MPS2222A,TO-92,EBC	
Q511	141.8	156.1	0501-000303	0.25W,-60V,-50V,-5V,-0.15A	TR-PNP,KSA733,TO-92,EBC	
Q512	206.4	143.3	0505-001181	FET-SILICON	IRF634A,N,250V,8.1A,450mohm,74	
Q513	279.3	160.7	0501-000303	0.25W,-60V,-50V,-5V,-0.15A	TR-PNP,KSA733,TO-92,EBC	
Q600	208.7	99.4	0501-000389	TR-SMALL SIGNAL	KSC815,NPN,400mW,TO-92,TP,120-	
Q601			0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	
Q602	99.8	89.9	0501-000389	TR-SMALL SIGNAL	KSC815,NPN,400mW,TO-92,TP,120-	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
Q603	150.6	91.3	0501-000389	TR-SMALL SIGNAL	KSC815,NPN,400mW,TO-92,TP,120-	
R1	150.6	91.3	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R151			2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R152	73.3	37.5	2001-000553	R-CARBON	270ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R2			2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R200	78.8	22.9	2001-000035	REF-CF,220,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R202	77.1	19.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R203	31.5	72.1	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R204	31.5	69.3	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R205	38.7	64	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R206	32.3	64	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R207	56.7	60.5	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R208	54	74.9	2001-000075	R-CARBON	39Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R209	100.6	120.9	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R210	60	66.8	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R211	82.2	83.7	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R212	19.9	61.5	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R213	19.9	64.2	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R214	11.5	126.6	2001-000538	R-CARBON	24Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R215	11.5	129.1	2001-000538	R-CARBON	24Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R216	71.2	99.3	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R217	11.6	123.7	2001-000538	R-CARBON	24Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R218	34	79.7	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R219	34	82.6	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R220	66.6	34.2	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R221	35	12.4	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R222	40.5	12.1	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R223	37.9	12.4	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R224	37.8	30.1	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R225	35	30.1	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R226	31.9	30.1	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R227	43.5	30.4	2001-000738	R-CARBON	4.7Mohm,5%,1/6W,AA,TP,1.8x3.2m	
R228	66.6	91.8	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R229	66.6	89.3	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R230	311.2	107	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R231	295.5	137	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R232	15.8	90.3	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R233	12.7	39.1	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R235	18.7	101.3	2001-000034	R-CARBON	220ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R236	13.4	85.9	2001-000034	R-CARBON	220ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R255	67.2	86.2	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R256			2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R257			2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R258			2001-000074	REF-CF,33K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R3	150.6	91.3	2001-000059	R-CARBON	5.6Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R301	117.3	50.2	2001-000245	REF-CF,1.5,5%,1/2W	350V,-350 TO +350PPM/C,R-AXIAL	
R302	114.4	45.1	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
R303	79.9	78.2	2004-000216	R-METAL	10Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R304	91.7	48.5	2004-000481	R-METAL	2.4Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R305	91.7	45.3	2004-000970	R-METAL	470ohm,1%,1/4W,AA,TP,2.4x6.4mm	
R306	78.3	64.5	2004-001022	R-METAL	5.6Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R307	100.3	68.9	2003-000437	R-METAL OXIDE(S)	1.5ohm,5%,2W,AA,TP,4x12mm	
R309	276.2	186.3	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R311	278.5	179.8	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R312	291.1	177	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R313	287.8	169.4	2001-000042	REF-CF,1K,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
R4			2001-000059	R-CARBON	5.6Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R401	61.5	121.2	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R402	58.9	121.2	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R403	53.8	129.5	2001-000044	R-CARBON	1.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R404	51.2	129.5	2001-000044	R-CARBON	1.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R405	48.3	139.9	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R406	24.4	126.8	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R407	79.5	156	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R408	79.5	158.5	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R409	42.9	157.2	2004-000899	R-METAL	4.7Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R410	51.5	163.9	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R411	51.5	172.9	2001-000224	R-CARBON	1.2Mohm,5%,1/6W,AA,TP,1.8x3.2m	
R412	66.1	165.8	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R413	41.3	171	2001-000093	R-CARBON	470Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R414	22	178.2	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R415	24.5	191.2	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R416	16.2	164.4	2001-000108	R-CARBON	18Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R417	16.2	161.8	2001-000632	R-CARBON	30Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R418	36.4	160.7	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R421	90.7	165.5	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R422	93.7	160.4	2001-001005	R-CARBON	82ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R423			2001-000048	R-CARBON	2.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R424	116.5	161.8	2003-000793	REF-MO,8.2K,5%,2W(S)	500V,-200 TO +200PPM/C,R-AXIAL	
R425	123.2	182.4	2003-002108	R-METAL OXIDE(S)	300ohm,5%,3W,AA,TP,15x5.5mm	
R426	135.1	166.9	2003-000512	REF-MO,15K,5%,3W(S)	500V,-200 TO +200PPM/C,R-AXIAL	
R427	72.1	167.3	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R428	24.8	195.5	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R429	27.8	195.5	2001-000632	R-CARBON	30Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R430	34.1	195.5	2001-000632	R-CARBON	30Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R431	37	195.5	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R432	42	195.5	2001-000632	R-CARBON	30Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R433	44.9	195.5	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R434	62.4	209.7	2001-000023	REF-CF,47,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
R437	105.7	222.3	2001-000037	REF-CF,330,5%,1/2W(S)	300V,-200 TO +200PPM/C,R-AXIAL	
R438	102.9	222.2	2001-000084	REF-CF,100K,5%,1/4W	250V,-600 TO -150PPM/C,R-AXIAL	
R439	149.3	221.1	2001-000037	REF-CF,330,5%,1/2W(S)	300V,-200 TO +200PPM/C,R-AXIAL	
R440	78.1	231.5	2003-000767	REF-MO,680,5%,2W(S)	350V,-350 TO +350PPM/C,R-AXIAL	
R441	127.7	209	2003-000710	R-METAL OXIDE(S)	47ohm,5%,2W,AA,TP,4x12mm	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
R442	85.7	191.8	2001-000019	R-CARBON(S)	10ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R443	165.6	178.6	2001-000020	R-CARBON(S)	22ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R444	160.1	164.9	2003-000005	R-METAL OXIDE(S)	1ohm,5%,2W,AA,TP,4x12mm	
R445	98.6	198.6	2003-000407	R-METAL OXIDE(S)	0.6ohm,5%,2W,AA,TP,4x12mm	
R446	90	202.1	2003-000428	R-METAL OXIDE(S)	1.5Kohm,5%,1W,AA,TP,3.3x9mm	
R447	218.6	111.7	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R448	27	191.2	2001-000075	R-CARBON	39Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R449	62.4	207	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R450	246	113.4	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R451	305.5	106.3	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R452			2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R453	90.6	129.8	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R454			2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R455			2001-000035	REF-CF,220,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R5			2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R502	257.7	127.3	2001-000040	REF-CF,470,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R503	283.9	134.2	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R504	284.5	131.2	2003-000659	REF-MO,33,5%,1W(S)	350V,-350 TO +350PPM/C,R-AXIAL	
R505	239.2	132.4	2003-000468	R-METAL OXIDE(S)	10ohm,5%,1W,AA,TP,3.3x9mm	
R506	243.3	129.5	2001-001170	R-CARBON(S)	6.8ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R507	241.9	135.3	2001-000211	REF-CF,1,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
R508	276.8	168.1	2001-000073	R-CARBON	33Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R509	246.1	151.4	2001-000021	REF-CF,27,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
R510	232.3	151.5	2001-000107	REF-CF,150K,5%,1/2W(S)	300V,-200 TO +200PPM/C,R-AXIAL	
R512	270.5	198.6	2003-000752	R-METAL OXIDE(S)	6.8Kohm,5%,2W,AA,TP,4x12mm	
R513	270.6	219.3	2003-000661	R-METAL OXIDE(S)	33ohm,5%,2W,AA,TP,4x12mm	
R514	160.2	149.4	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R515	175	141.5	2001-000976	REF-CF,8.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R516	140.1	132.9	2001-000072	REF-CF,22K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R517	137.6	132.9	2001-000688	REF-CF,390K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	⚠
R518	145.8	126.4	2001-000064	REF-CF,7.5K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	⚠
R519	136.3	150.4	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R520	174	144.2	2001-000456	REF-CF,2.2,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
R521	202.3	143.6	2001-000077	REF-CF,47K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R522	186	130.7	2001-000015	R-CARBON(S)	0.5ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R523	186	136.2	2001-000015	R-CARBON(S)	0.5ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R524	145.3	150.4	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R525	131.3	150.4	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R526	128.4	137.8	2001-000057	REF-CF,5.1K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	⚠
R527	208.1	232.4	2004-000560	R-METAL	220Kohm,1%,1/4W,AA,TP,2.4x6.4m	⚠
R528	214.7	154.3	2003-000428	R-METAL OXIDE(S)	1.5Kohm,5%,1W,AA,TP,3.3x9mm	
R529	126	136.7	2001-000057	REF-CF,5.1K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	⚠
R534	303.2	222.9	2001-000546	R-CARBON	270Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R535	283.3	124.4	2001-000562	R-CARBON	27Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R536	302.4	209.9	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R537			2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R538	297.2	233.9	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
R539	294.8	233.9	2001-000060	R-CARBON	6.8Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R540	299.8	222.9	2001-000084	REF-CF,100K,5%,1/4W	250V,-600 TO -150PPM/C,R-AXIAL	
R541	299.8	222.9	2001-000090	R-CARBON	180Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R542			2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R543	286.7	164.3	2001-000722	R-CARBON	4.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R544	271.1	162.5	2001-000072	REF-CF,22K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R545	291.3	140.5	2001-000064	REF-CF,7.5K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R546	114.6	119.9	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R547	105.2	127	2004-000643	R-METAL	270Kohm,1%,1/4W,AA,TP,2.4x6.4m	⚠
R548	94.1	130.5	2004-001040	R-METAL	50Kohm,1%,1/4W,AA,TP,2.4x6.4mm	⚠
R549	108.5	127.9	2001-000077	REF-CF,47K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R550	106.1	148.7	2001-000562	R-CARBON	27Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R551	89.6	157.9	2001-000074	REF-CF,33K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R552	105.8	139.5	2001-000077	REF-CF,47K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	⚠
R553			2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R556	131	128.2	2001-000976	REF-CF,8.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R560	277.7	198.6	2001-000431	R-CARBON	1Mohm,5%,1/2W,AA,TP,3.3x9mm	
R583	31.1	167.4	2001-000538	R-CARBON	24Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R6			2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R600	197	97.2	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R601	233.7	99.7	2001-000023	REF-CF,47,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
R602	164.9	16.8	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	⚠
R603	144.9	20.6	2004-000947	R-METAL	43Kohm,1%,1/4W,AA,TP,2.4x6.4mm	⚠
R604	190.1	105.9	2001-000495	R-CARBON	20Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R605	164.9	13.1	2004-000150	R-METAL	1.5Kohm,1%,1/4W,AA,TP,2.4x6.4m	⚠
R606	133.9	23.3	2001-000060	R-CARBON	6.8Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R607	146.8	14	2004-004096	R-METAL	2.52Kohm,1%,1/4W,AA,TP,2.4x6.4	⚠
R608	285	44.6	2001-000642	R-CARBON	330Kohm,5%,1/2W,AA,TP,3.3x9mm	⚠
R609	247.7	45.6	2003-000771	REF-MO,68K,5%,2W(S)	500V,-200 TO +200PPM/C,R-AXIAL	
R610	188.8	31.8	2003-000738	R-METAL OXIDE(S)	56Kohm,5%,2W,AA,TP,4x12mm	
R611	152.2	47.3	2003-000471	R-METAL OXIDE(S)	10ohm,5%,2W,AA,TP,4x12mm	
R612	199	60.4	2001-001079	R-CARBON(S)	15ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R613	152.6	34.1	2003-000468	R-METAL OXIDE(S)	10ohm,5%,1W,AA,TP,3.3x9mm	
R614	156.8	90.8	2001-000077	REF-CF,47K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R615	154.3	97.2	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R616	215.3	35.8	2003-000010	R-METAL OXIDE(S)	8.2Kohm,5%,3W,AA,TP,6x16mm	
R617	98.1	97.7	2001-001138	R-CARBON(S)	390ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R618	147	95.4	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R619	181.8	94.8	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R620	110.5	101.5	2001-000988	REF-CF,820K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R621	70.7	96.5	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R622	207.3	59.1	2001-001107	R-CARBON(S)	220ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R646	307.3	177.5	2001-000026	REF-CF,75,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R647	307.3	190.5	2001-000026	REF-CF,75,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R648	307.3	180	2001-000026	REF-CF,75,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R649	307.3	193	2001-000026	REF-CF,75,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RL401	91.8	219.2	3501-001064	RELAY-POWER	12Vdc,0.36W,2A,1FormC,10mS,5mS	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
RL601	252.6	90.7	3501-000136	RELAY-MINIATURE	12V,360mW,5A,1FormA,10mS,10mS	
RL601_D	281	98.1	3501-000266	RELAY-POWER	12V,720mW,5A,2FormA,8mS,3mS	TCO
RR01	307.3	203.5	2001-000026	REF-CF,75,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RR02	307.3	206	2001-000026	REF-CF,75,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
SK501			4715-000001	SURGE ABSORBER	1KV,+50-10%	
SW1	307.3	206	3404-000243	SWITCH-TACT	15V,20mA,160gf+-50gf,6x3.4mm,S	
SW2			3404-000244	SWITCH-TACT	15V,20mA,90-170gf,7.5x7mm,SPST	
SW3			3404-000244	SWITCH-TACT	15V,20mA,90-170gf,7.5x7mm,SPST	
SW4			3404-000244	SWITCH-TACT	15V,20mA,90-170gf,7.5x7mm,SPST	
SW401			3406-000002	SWITCH-TOGGLE,SP3T	ON-ON-ON,STRAIGHT,	
SW5			3404-000244	SWITCH-TACT	15V,20mA,90-170gf,7.5x7mm,SPST	
SW6			3404-000244	SWITCH-TACT	15V,20mA,90-170gf,7.5x7mm,SPST	
SW601	299.3	17.5	3403-000190	SWITCH-KEY,SPST	250V,5A,SPST,Y,ANGLE	⚠
SW602	305.1	22	3403-000178	SWITCH-PUSH	250V,5A,DPST	
T401	142	177.7	BH26-30303Y	TRANS-HOR.DRIVE	6-4(50MH),6P,EE2017,SB-5S,6-	⚠
T402	164.1	189.8	BH26-30337K	TRANS-HOR.DRIVE	1.5mH,10P,EER2828,EER282	TCO ⚠
T501	240.1	175.7	BH26-10335N	TRANS-FBT	0.74mH,14P,0.74mH,FKD-15	⚠
T502			BH26-30337B	TRANS-FOCUS	1.2MH/500MH,7P,EE-1916,PL-3	⚠
T601	183.5	26.7	BH26-20336D	TRANS-POWER	470uH/250uH,18P,EI3942,PL-3,7u	⚠
T602	182.7	77	BH26-30302S	TRANS-SYNC.	3-1(250UH),SB-5S,UU1116,3-	⚠
TH601	286.1	86.6	1404-000002	THERMISTOR-NTC	9OHM,20%	⚠
TH602	243.8	56.2	1404-001020	THERMISTOR-NTC	8ohm,15%,17mW/C,BK	
VR501	226.1	232.6	2103-000454	VR-SEMI	50Kohm,25%,0.3W,SIDE	☢
X201	45.5	27.1	2801-003413	CRYSTAL-UNIT	24MHz,30ppm,28-ABQ,18pF,20ohm	
ZD127	305.2	162.9	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	

9-2 Video PCB Parts

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
BD101	106.6	39.5	3301-000011	CORE-FERRITE BEAD	AA,3.5x1.0x5.7mm,1500,2375G	
BD102	79	53.3	3301-000011	CORE-FERRITE BEAD	AA,3.5x1.0x5.7mm,1500,2375G	
BD103	40.2	11.1	3301-000011	CORE-FERRITE BEAD	AA,3.5x1.0x5.7mm,1500,2375G	
C101			2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C103	26.1	90.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C104	10.3	62.5	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C105	23.9	21.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C106	21.1	55.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C107	21.2	48.4	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C108	21.1	42.6	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C109	111.8	34	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C110	112.4	43.8	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C111	111.7	26.6	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C112	111.4	18.6	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C113	117.8	21.3	2201-000376	CAP-CERAMIC,221J,1H,SL	220PF,50V,5%,P350TON1000PPM, SL	
C114	109.8	36.5	2201-000376	CAP-CERAMIC,221J,1H,SL	220PF,50V,5%,P350TON1000PPM, SL	
C116	111.4	16	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C117	109	10.4	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C118	95.7	53.4	2401-000023	C-AL	1uF,20%,50V,GP,5x11mm,5mm,TP	
C119	89.1	45.7	2401-000026	C-AL	3.3uF,20%,50V,GP,5x11mm,5mm,TP	
C120	109.6	55.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C121	98.2	64	2201-000138	C-CERAMIC,DISC	100pF,10%,50V,Y5P,4.0X4.0,2.5	
C122	88	103.6	2301-000015	C-FILM,PEF	10nF,5%,100V,7x3.2x7mm,5mm,TP	
C123	107.2	64.5	2201-000138	C-CERAMIC,DISC	100pF,10%,50V,Y5P,4.0X4.0,2.5	
C125	82.7	103.6	2301-000015	C-FILM,PEF	10nF,5%,100V,7x3.2x7mm,5mm,TP	
C126			2201-000138	C-CERAMIC,DISC	100pF,10%,50V,Y5P,4.0X4.0,2.5	
C127	104.3	55.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C128	103.2	104.2	2301-000015	C-FILM,PEF	10nF,5%,100V,7x3.2x7mm,5mm,TP	
C129	72.2	27.3	2201-000530	C-CERAMIC,DISC	4.7nF,10%,500V,Y5P,12.5x4,5,TP	
C130	75.2	61.9	2201-000288	C-CERAMIC,DISC	1nF,10%,2KV,Y5P,10x5mm,10mm,TP	
C131	60.3	9.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C132	21.8	34	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C133	12	93	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C171	24.2	60.4	2201-000232	C-CERAMIC,DISC	150pF,10%,50V,Y5P,4x3.5,5,TP	
C172	36.4	41.8	2401-000027	C-AL	4.7uF,20%,50V,GP,5x11mm,5mm,TP	
C175	115.1	55.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C199	115.1	55.2	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
CB01			2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
CB03	42.5	57.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CB04	65.6	86.8	2305-000009	C-FILM,MPEF	100nF,5%,250V,13x11x6.5,7.5mm	
CG01	13.2	45.6	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
CG03	42.5	60.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CG04	65.6	98.9	2305-000009	C-FILM,MPEF	100nF,5%,250V,13x11x6.5,7.5mm	
CN101	56.5	5.3	3711-003133	CONNECTOR-HEADER	BOX,13P,1R,2.5mm,STRAIGHT,SN	
CN102	9	28.1	3711-000044	CONNECTOR-HEADER	BOX,6P,1R,2.5mm,STRAIGHT,SN	
CN103	44.2	27.4	3712-000338	CONNECTOR-TERMINAL	PIN,MALE,2.36mm	
CN104	83.6	60.1	3712-000338	CONNECTOR-TERMINAL	PIN,MALE,2.36mm	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
CR01	13.2	51.3	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
CR03	29.5	63.4	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CR04	65.6	92.9	2305-000009	C-FILM,MPEF	100nF,5%,250V,13x11x6.5,7.5mm	
CRT1	65.6	92.9	BH03-10013A	CRT,COLOR,15	M36LGE27XX01(MULTI)	
D101	12.6	13.7	0403-000003	DIODE-ZENER	UZ8.2BL,8.2V,7.7-8.2V,500mW,DO	
D102	12.6	16.4	0401-000005	DIODE-SWITCHING	1N4148,75V,150mA,500mW,4nS,DO-	
D103	44.5	54.6	0401-000005	DIODE-SWITCHING	1N4148,75V,150mA,500mW,4nS,DO-	
D104	28.7	100.5	0401-000005	DIODE-SWITCHING	1N4148,75V,150mA,500mW,4nS,DO-	
DB03	65.3	89.9	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DB04	52	96.8	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DB05	89.8	91.7	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DG03	64.2	102	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DG04	52	101.8	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DG05	84.3	91.6	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DR03	65.3	95.9	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DR04	52	99.3	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DR05	86.7	91.6	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
EY1	54.4	46	6042-000002	EYELET	ID1.5,OD2,L3.1,SN,BSS3-E/EH	
EY10	9.1	9.5	6042-000001	EYELET	ID2.2,OD2.7,L3.1,SN,BSS3-E/EH	
EY2	66.4	62.7	6042-000002	EYELET	ID1.5,OD2,L3.1,SN,BSS3-E/EH	
EY3	60.1	30.4	6042-000002	EYELET	ID1.5,OD2,L3.1,SN,BSS3-E/EH	
EY4	66.4	42.1	6042-000002	EYELET	ID1.5,OD2,L3.1,SN,BSS3-E/EH	
H/S	31	85	BH62-30398A	HEAT/SINK-REGULATION	A6063,T1.5,CGP1607	
IC101	24.4	53	1204-000015	IC-SIGNAL PROCESSOR	MC13282,DIP,24P,PLASTIC,8.4V	⚠ ⚡
IC102	102.8	17.8	1204-001015	IC-OSD PROCESSOR	LSC4350,DIP,24P,300MIL,PLASTIC	⚠ ⚡
IC103	112.4	82.1	1201-000229	IC-OP AMP	324,DIP,14P,300MIL,QUAD,100V/m	
IC105	40.3	76.5	BH13-10334K	IC-HYBRID	G17E,LM2405,SIP,11P,CRT/DRIVER	⚠ ⚡
JW1			BH39-40306C	CBF-HARNESS	60MM,BLK,1015,AWG22	
L101	107.5	25.3	2701-000125	INDUCTOR-AXIAL,150UH	FIX,150UH,10%,50,2.6X7MM	
LB01	76.6	73.5	2701-000173	INDUCTOR-AXIAL	330nH,20%,4.2x9.8mm	
LG01	84.7	73.5	2701-000173	INDUCTOR-AXIAL	330nH,20%,4.2x9.8mm	
LR01	80.6	73.5	2701-000173	INDUCTOR-AXIAL	330nH,20%,4.2x9.8mm	
Q101	32.7	62.2	0501-000122	TR-SMALL SIGNAL	2N3904,NPN,625mW,TO-92,100-3	
Q102	19.9	10.9	0501-000010	TR-SMALL SIGNAL	KSC1008,NPN,80V,60V,700mA,800m	
Q103	93.5	98.7	0501-000412	TR-SMALL SIGNAL	KSP42,NPN,625mW,TO-92,40	
Q105	117.3	93.6	0501-000412	TR-SMALL SIGNAL	KSP42,NPN,625mW,TO-92,40	
Q154	105.4	99.2	0501-000412	TR-SMALL SIGNAL	KSP42,NPN,625mW,TO-92,40	
R101	22.9	57.4	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R102	34.4	49.4	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R103	26.3	8.2	2001-001070	R-CARBON(S)	120ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R104	44.5	52	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R105	52.9	5.3	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R107			2001-000464	REF-CF,2.4K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R108	111.7	31.5	2001-000097	REF-CF,1M,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R109	118	24	2001-000059	REF-CF,5.6K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R110	83.8	12.7	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R111	90.6	7.3	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	

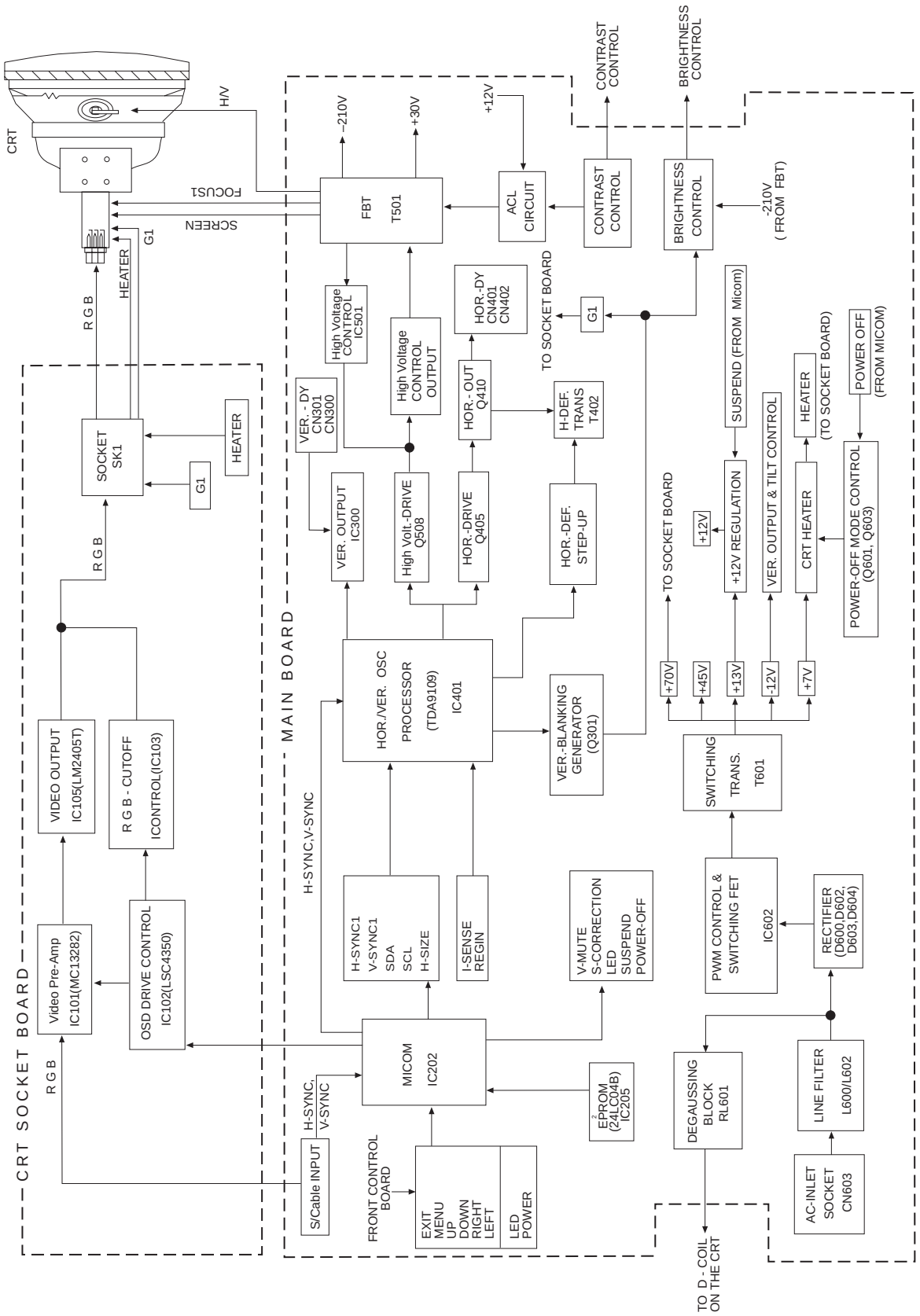
Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
R112	90.5	4.8	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R113	94.4	14.8	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R114	84.1	40.9	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R115	99	48.3	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R116	99.9	99.8	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R117	94.9	70	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R118	107	48.2	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R119	102.9	58.6	2001-000088	R-CARBON	120Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R120	101.4	67.9	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R121	100.6	65.1	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R122	103.8	67.8	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R123	102	72.1	2004-000157	R-METAL	1.5Mohm,5%,1/4W,AA,TP,2.4x6.4m	
R124	96.6	93.3	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R125	102.4	93.3	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R127	112.4	48.2	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R128	109.9	58.1	2001-000088	R-CARBON	120Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R129	112.2	64.6	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R130	101.4	85	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R131	104.7	85	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R132	108.6	92.9	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R133	111.2	92.9	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R134	101.5	48.3	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R135	114.7	58.2	2001-000088	R-CARBON	120Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R137	95.6	89.8	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R138	111.1	87.2	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R139	117	70.3	2004-000157	R-METAL	1.5Mohm,5%,1/4W,AA,TP,2.4x6.4m	
R140	110.6	90.4	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R141	113.8	99.5	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R142	72.6	41.4	2001-001107	R-CARBON(S)	220ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R144	63.5	26.5	2008-001056	R-FUSIBLE(S)	2.2ohm,5%,1W,AA,TP,9.5x3.5mm	
R145	12	73.4	2003-000015	R-METAL OXIDE(S)	10Kohm,5%,1W,AA,TP,3.3x9mm	
R146	118.7	29.1	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R177	103.5	87.5	2004-000157	R-METAL	1.5Mohm,5%,1/4W,AA,TP,2.4x6.4m	
R193	117.3	65.3	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RB03	90.6	33.7	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB04	46.6	70.7	2001-000301	REF-CF,10,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RB05	41.5	65.9	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB06	50.2	90.4	2001-000021	R-CARBON	27ohm,5%,1/4W,AA,TP,2.4x6.4mm	
RB07	76.6	98.6	2001-000547	R-CARBON	270Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RB08	73.3	73.3	2001-000028	R-CARBON(S)	100ohm,5%,1/2W,AA,TP,2.4x6.4mm	
RG03	90.6	36	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
RG04	44.2	71.3	2001-000301	REF-CF,10,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RG05	38.9	65.8	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RG06	47.2	93.5	2001-000021	R-CARBON	27ohm,5%,1/4W,AA,TP,2.4x6.4mm	
RG07	81.9	98.6	2001-000547	R-CARBON	270Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RG08	73.3	79.8	2001-000028	R-CARBON(S)	100ohm,5%,1/2W,AA,TP,2.4x6.4mm	
RR03	90.6	38.3	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
RR04	27.6	73.5	2001-000301	REF-CF,10,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RR05	30.5	73.5	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RR06	49	87.7	2001-000021	R-CARBON	27ohm,5%,1/4W,AA,TP,2.4x6.4mm	
RR07	79.3	98.6	2001-000547	R-CARBON	270Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RR08	72.6	76.4	2001-000028	R-CARBON(S)	100ohm,5%,1/2W,AA,TP,2.4x6.4mm	
SK101	77	44.3	4715-000001	SURGE ABSORBER	1KV,+50-10%	
SK102	71.7	64.3	4715-000001	SURGE ABSORBER	1KV,+50-10%	
SK103	63.1	52.4	3704-001042	SOCKET-CRT	7P,22.5PI,12PI,SN	
SK104	63.8	69.5	4715-000001	SURGE ABSORBER	1KV,+50-10%	
SK105	56.2	66	4715-000001	SURGE ABSORBER	1KV,+50-10%	
SK106	58	77.2	4715-000001	SURGE ABSORBER	1KV,+50-10%	

Others

Loc. No.	Code No.	Description	Specification	Remarks
CRT	BH03-10013A	CRT-COLOR,15,0.28	M36LGE27XX01,EX-2,0.25	
CRT GND	BH39-40364W	CBF-HARNESS	2P,450MM,BLK,UL1015,AWG18,YF	
D-COIL	BH39-10335M	COIL-DEGAUSSING	280X255X1060MM,11.4MH,21	
MAGNET RUBBER	3302-000006	MAGNET RUBBER	AF,14G,1620-1980G,0.58-0.9	
P/CORD	BH94-40001F	ASS'Y POWER CORD	250V/10A,1830,BLK,DET	CHINA
	BH94-40001Y	ASS'Y POWER CORD	250V/10A,1230,IVY,DET	UK
	BH94-40001B	ASS'Y POWER CORD	250V/6A,1830,IVY,DET	GERMANY
	BH94-40001E	ASS'Y POWER CORD	125V,7/10A,1830,IVY,DET	HK
SIGNAL CABLE	BH39-20336N	CBF-HARNESS	15P/15P,1530MM,15P/15P,IVY	
CIS	BH39-40365C	CBF-HARNESS	3P,550MM,GRY,UL2547,AWG26-C	TCO
CIS	BH72-10348A	SHEET-LMF	PC SHEET	TCO
CIS	6501-000004	CABLE TIE	DA-80,T1,W2.5,L80,NTR,NYLON66	TCO
PBA ASS'Y CODE	BH94-30012E	ASS'Y PCB	CKF5607LXX/CNT,TSED	CHINA
	BH94-30010P	ASS'Y PCB	CKF5607	USA
	BH94-30011T	ASS'Y PCB	CKF5607T1D	SEG
	BH94-30012H	ASS'Y PCB	CKF5607T1D,RUSSIA	SESPO
B/D ASS'Y CODE	BH98-10011W	ASS'Y PCB MAIN	CKF5607LXX/CNT,TSED	CHINA
	BH98-10010H	ASS'Y PCB MAIN	CKF5607	USA
	BH98-10011N	ASS'Y PCB MAIN	CKF5607T1D	SEG
	BH98-10011Z	ASS'Y PCB MAIN	CKF5607T1D,RUSSIA	SESPO
	BH98-20004N	ASS'Y PCB VIDEO	CKF5607	USA
	BH98-50001Z	ASS'Y PCB CONTROL	CKF5607L	USA

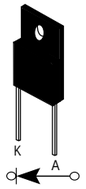
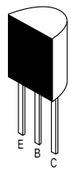
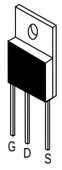
10 Block Diagram

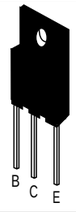
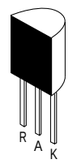
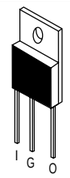
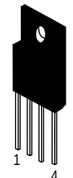
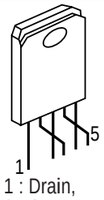


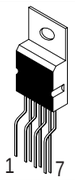
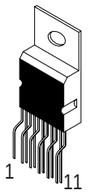
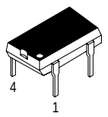
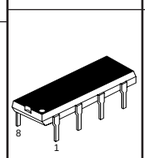
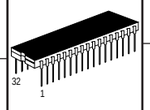
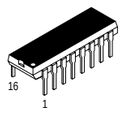
Memo

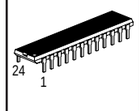
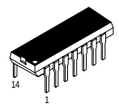
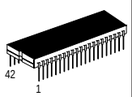
11 PCB Diagram

11-1 Semiconductor Lead Identification

PARTS	TYPE NO.	REF. NO.
	FMP-G2FS	D403
	KSC945	Q502
	KSC815	Q201, Q202, Q203, Q409, Q501, Q600, Q602, Q603
	KSA733	Q204, Q401, Q405, Q511, Q513
	KSC1008	Q102
	2N3904	Q101, Q403, Q412, Q508
	KSP42	Q103, Q105, Q154, Q405
	MPS2222A	Q510
	MPS3646	Q414
	2N6520	Q503
	2N3906	Q404, Q411
	KSB1116	Q507, Q601
	KSD1616	Q506
	IRF630	Q408, Q413
	IRF634	Q512
	IRFR/U230A	Q405, Q408

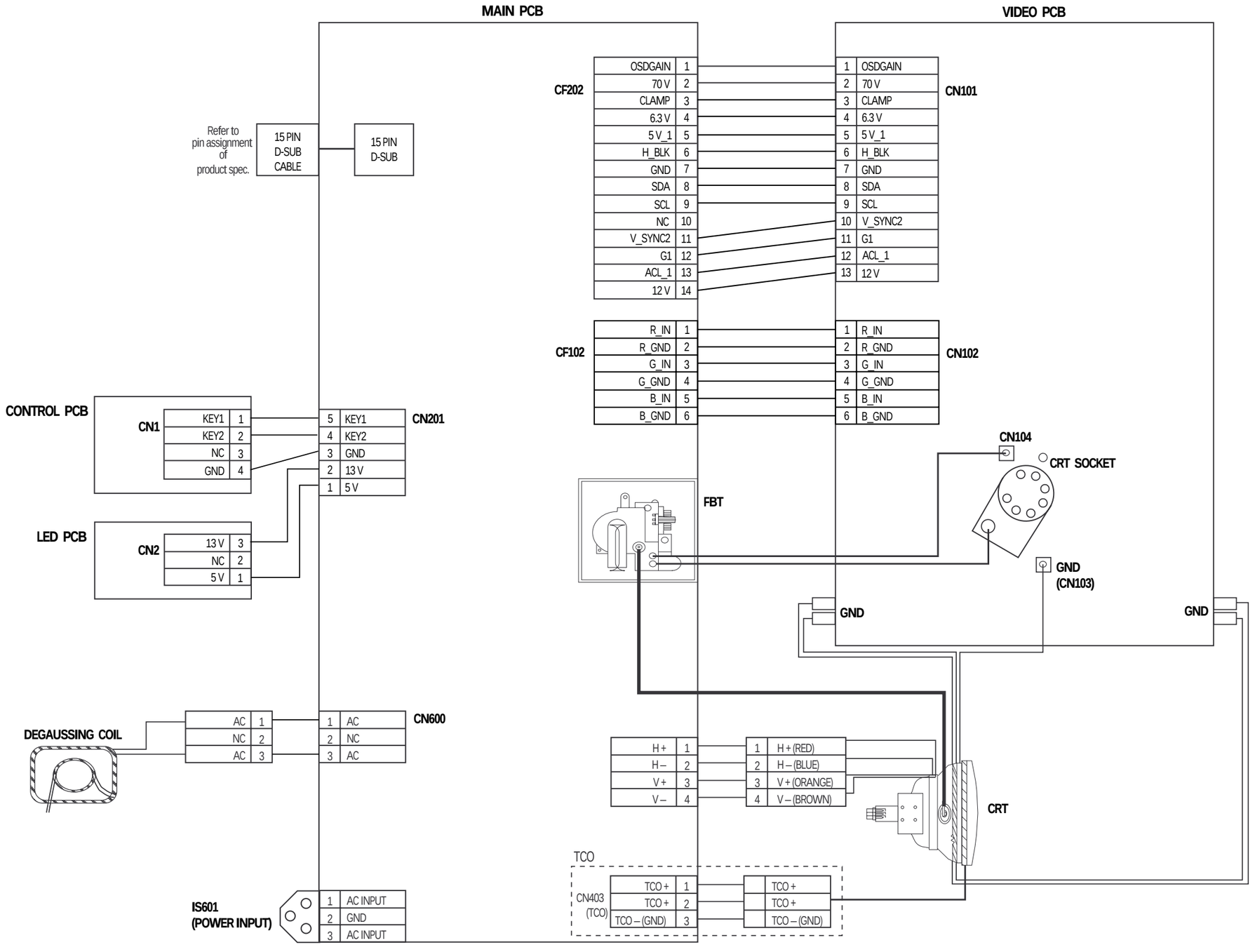
PARTS	TYPE NO.	REF. NO.
	KSC5088	Q410
	2SC5339	Q509
	TL431CLP	IC601
	KIA7805P	IC600
 1 : Vin, 2 : Vout, 3 : GND, 4 : Vcc	KA78R12	IC603
 1 : Drain, 2 : GND, 3 : Vcc, 4 : F/B, 5 : Sync	KA2S0680	IC602

PARTS	TYPE NO.	REF. NO.
	TDA9302H	IC300
	LM2405	IC105
	LTV817M-SM	QP601
	24LC04 24LC21 LM358N	IC205 IC204 IC502
	CD74HC714E	IC104
	LM324	IC103
	TL494	IC501

PARTS	TYPE NO.	REF. NO.
	LSC4350	IC102
	MC13282	IC101
	TDA9109	IC401
	72E75	IC202

Memo

12 Wiring Diagram



13 Schematic Diagrams

13-1 Power/Micom/Vert/V_Input Part Schematic Diagram

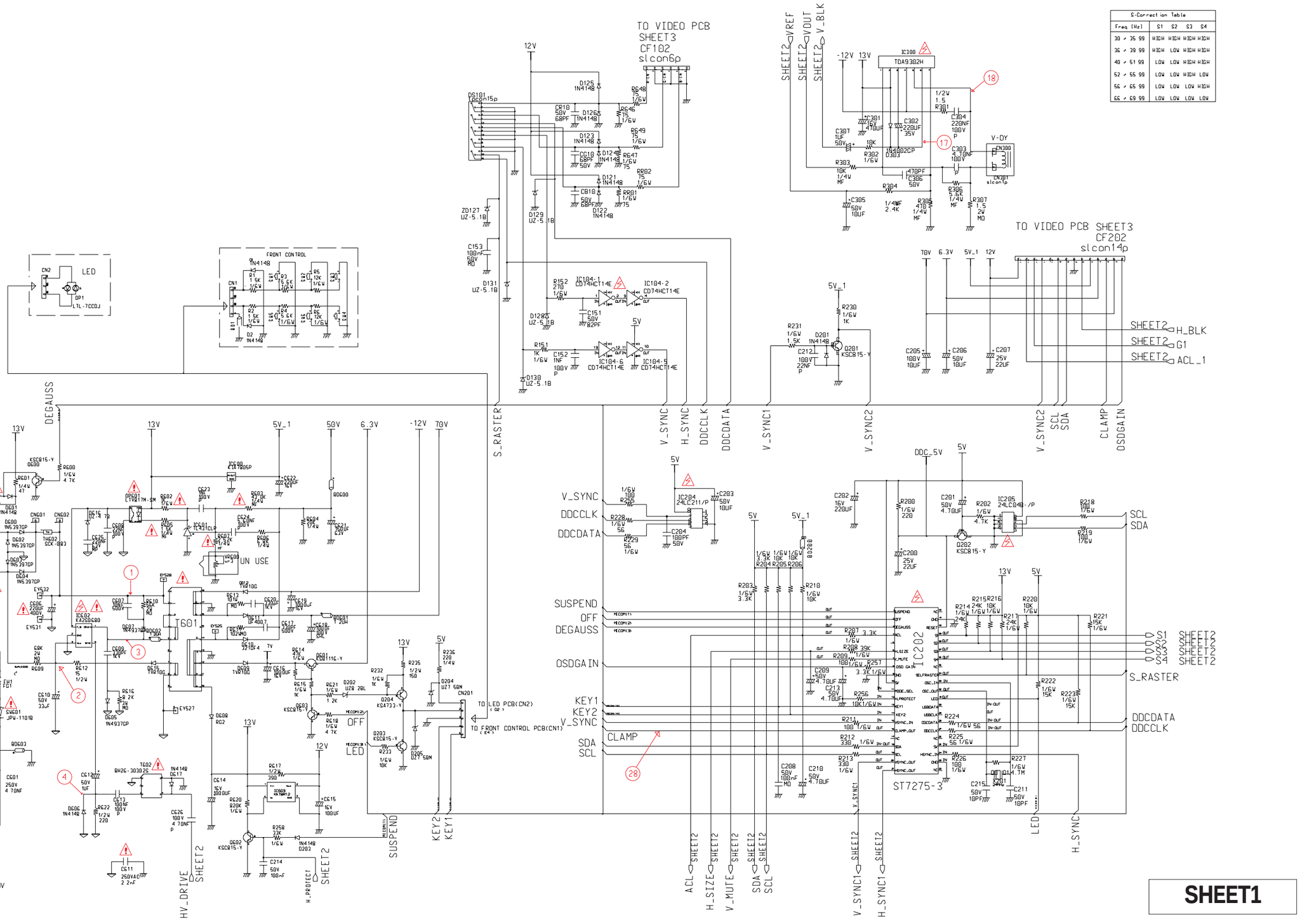


Table 13-1. IC104 (CD7411CT14E)

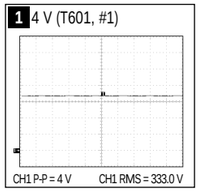
pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	1.6	4.236
2	7.4	1.784
3	7.4	1.784
4	2.2	4.820
5	NC	NC
6	NC	NC
7	GND	GND
8	NC	NC
9	NC	NC
10	400 mV	4.234
11	7.6	4.908
12	7.6	4.90
13	400 mV	320 mV
14	7.6	5.092

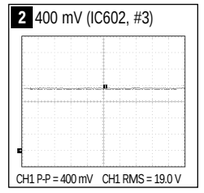
Unit: Vrms

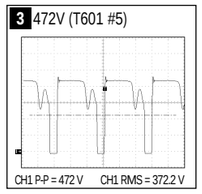
Table 13-2. IC202 (ST7275-3)

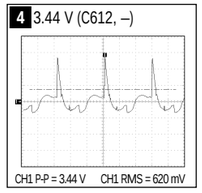
pin #	MODES		pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz		800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	16 mV	400 mV	22	NC	NC
2	4.628	7.4	23	GND	GND
3	16 mV	400 mV	24	1.404	4.824
4	4.068	6.0	25	5.064	5.088
5	3.640	5.4	26	NC	NC
6	4.052	6.6	27	3.820	3.844
7	5.64	7.6	28	3.872	3.896
8	3.796	4.8	29	8 mV	8 mV
9	GND	GND	30	8 mV	8 mV
10	5.064	7.6	31	24 mV	32 mV
11	12 mV	400 mV	32	2.712	2.710
12	1.908	2.6	33	2.468	2.474
13	5.064	7.6	34	64 mV	44 mV
14	5.060	7.6	35	NC	NC
15	404 mV	400 mV	36	7.308	7.228
16	972 mV	820 mV	37	40 mV	4.360
17	NC	NC	38	36 mV	7.216
18	5.060	5.12	39	36 mV	7.248
19	5.064	5.14	40	5.092	5.092
20	368 mV	120 mV	41	GND	GND
21	1.416	1.780	42	NC	NC

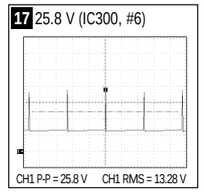
Unit: Vrms

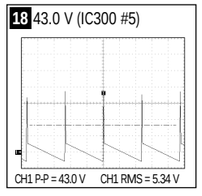












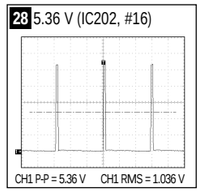


Table 13-3. IC204 (24LC211/P)

pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	NC	NC
2	NC	NC
3	NC	NC
4	GND	GND
5	6.2	2.476
6	6.2	3.840
7	400 mV	332 mV
8	7.5	5.092

Unit: Vrms

Table 13-4. IC205 (24LC04B-/P)

pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	GND	GND
2	GND	GND
3	GND	GND
4	GND	GND
5	7.8	5.096
6	7.7	5.090
7	GND	GND
8	7.6	5.092

Unit: Vrms

Table 13-5. IC300 (TDA9302H)

pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	1.34	600 mV
2	10.95	9.6
3	5.92	5.96
4	1.32	1.50
5	13.12	12.24
6	–10.5	–10.56
7	13.25	12.90

Unit: Vrms

Table 13-6. IC602 (KA2S0680)

pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	1.41	1.67
2	GND	GND
3	19.10	19.01
4	330.2	321.2
5	7.5	7.3

Unit: Vrms

13-2 H-Defl/High-Voltage Part Schematic Diagram

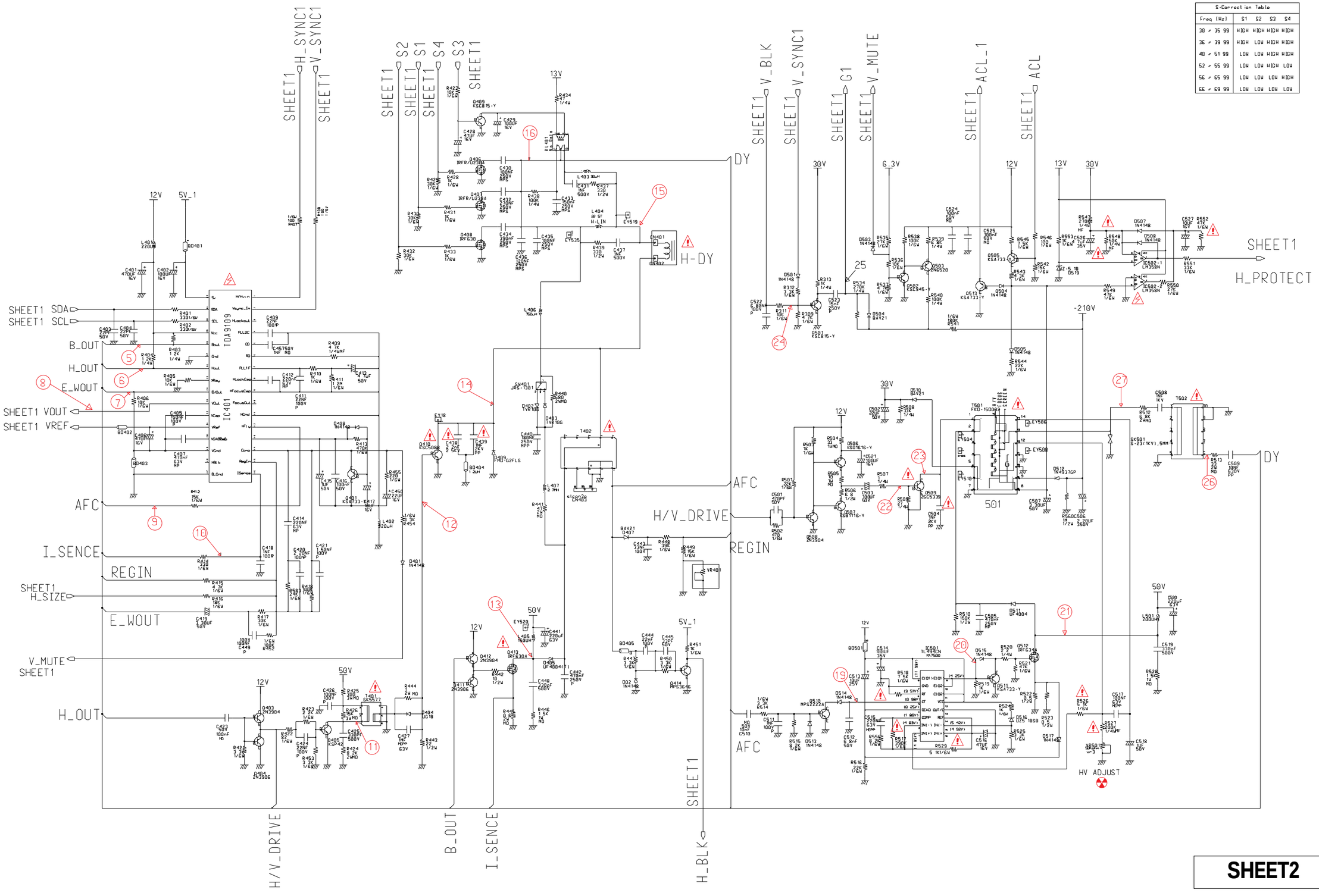


Table 13-7. IC401 (TDA9109)

pin #	MODES		pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz		800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	1.412	2.08	17	GND	GND
2	350 mV	4.86	18	NC	NC
3	5.088	5.17	19	VGND	VGND
4	2.728	3.21	20	5.20	5.35
5	4.408	4.67	21	8.12	8.11
6	3.660	2.21	22	3.780	3.588
7	3.664	2.21	23	3.90	3.684
8	8.02	8.06	24	2.938	3.066
9	50 mV	50 mV	25	28 mV	16 mV
10	NC	NC	26	6.51	6.50
11	72.8 mV	40 mV	27	GND	GND
12	860 mV	766 mV	28	6.51	4.56
13	7.99	8.0	29	11.84	11.82
14	3.65	3.17	30	5.17	5.14
15	5.55	5.79	31	5.17	5.14
16	260 mV	130 mV	32	5.18	5.15

Unit: Vrms

Table 13-8. IC501 (TL494CN)

pin #	MODES		pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz		800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	4.936	4.950	9	5.67	2.79
2	4.936	4.944	10	5.68	2.51
3	2.056	3.128	11	12.07	12.03
4	36 mV	16 mV	12	12.07	12.03
5	1.108	1.590	13	GND	GND
6	3.524	3.510	14	5.03	5.0
7	GND	GND	15	5.52	5.48
8	12.02	12.03	16	5.03	5.0

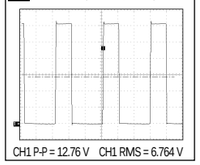
Unit: Vrms

Table 13-9. IC502 (LM358N)

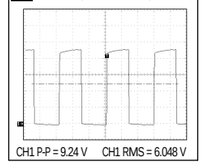
pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	28.2 mV	20.4 mV
2	5.088	5.090
3	4.276	4.296
4	GND	GND
5	GND	GND
6	3.696	3.772
7	8 mV	8 mV
8	13.15	13.17

Unit: Vrms

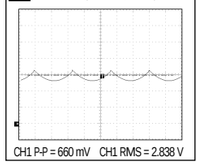
5 12.76 V (IC401, #28)



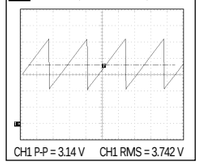
6 9.24 V (IC401, #26)



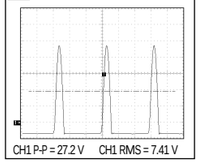
7 660 mV (IC401, #24)



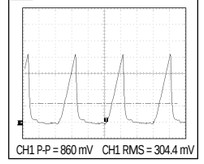
8 3.14 V (IC401, #23)



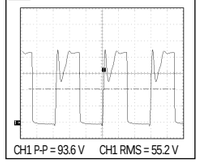
9 27.2 V (IC401, #12)



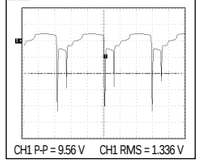
10 860 mV (IC401, #16)



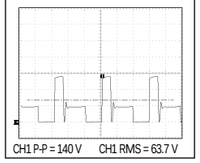
11 93.6 V (T401, #1)



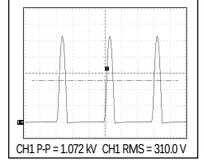
12 9.56 V (Q410, Base)



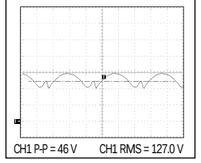
13 140 V (Q413, Drain)



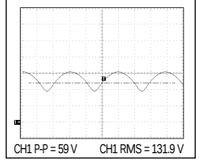
14 1.072 kV (Q410, Collector)



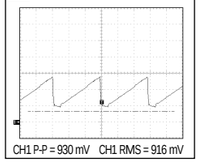
15 46 V (L404, S)



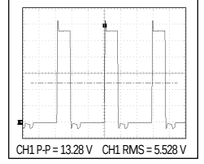
16 59 V (L404, F)



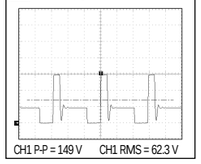
19 930 mV (IC501 #5)



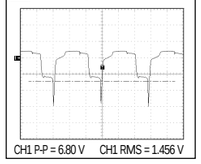
20 13.28 V (IC501, #9, 10)



21 149 V (Q512, Drain)

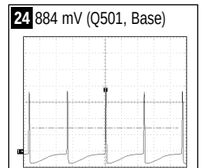


22 6.80 V (Q509, Base)

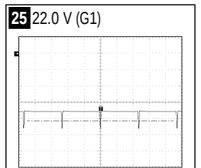


23 952 V (Q509, Collector)

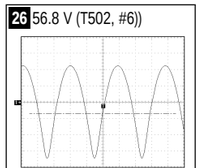
24 884 mV (Q501, Base)



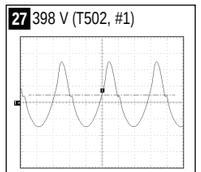
25 22.0 V (G1)



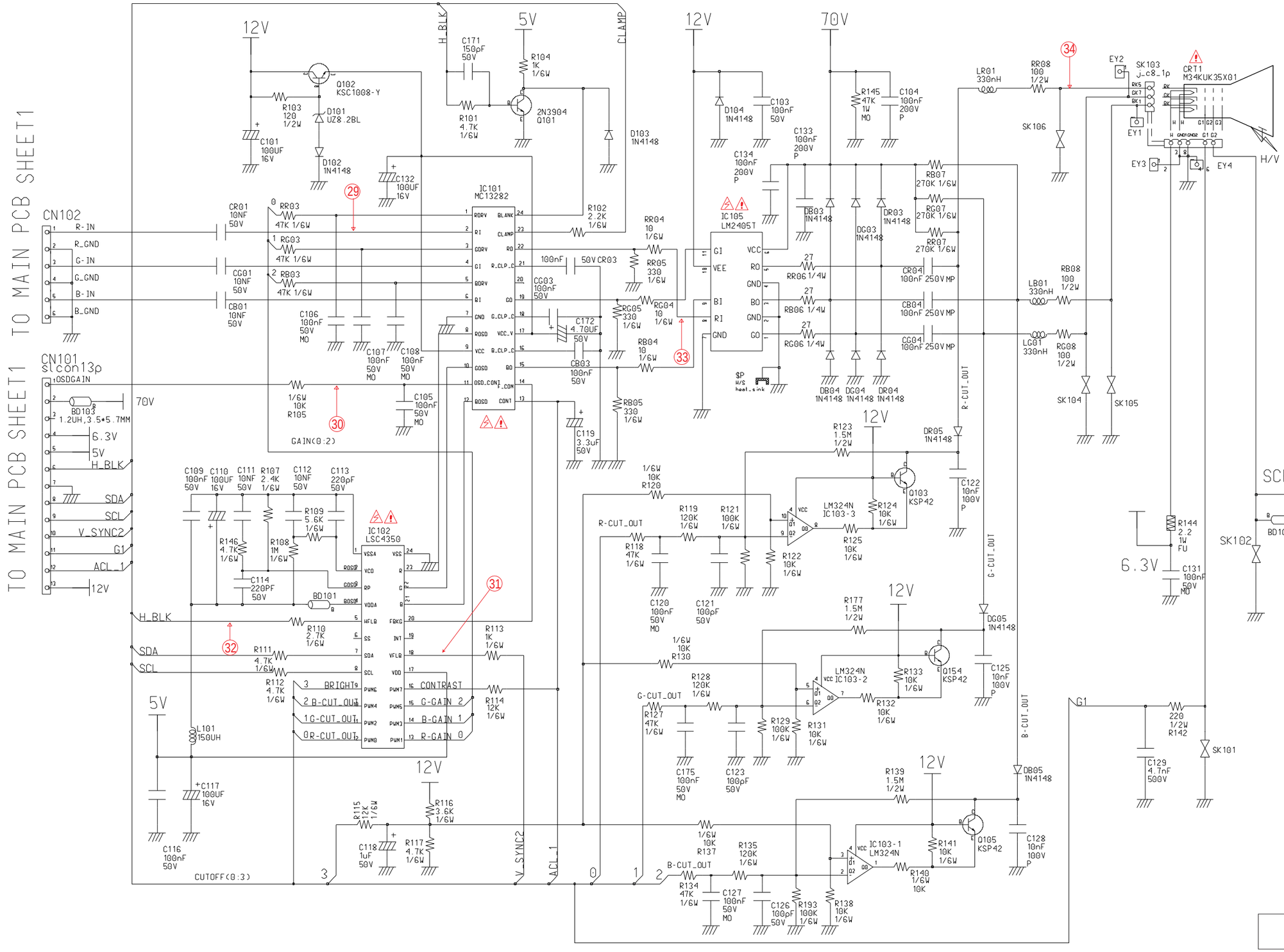
26 56.8 V (T502, #6))



27 398 V (T502, #1)



13-3 Video_Output Part Schematic Diagram



SHEET3

Table 13-10. IC101 (MC13282)

pin #	MODES		pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz		800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	2.740	2.742	13	2.57	2.56
2	3.136	2.672	14	0	0
3	2.680	2.708	15	2.216	2.294
4	3.136	2.728	16	4.652	4.756
5	2.648	2.676	17	8.47	8.47
6	3.122	2.692	18	4.65	4.77
7	GND	GND	19	2.182	2.268
8	32 mV	16 mV	20	NC	NC
9	8.45	8.47	21	4.550	4.660
10	0	0	22	2.266	2.342
11	2.84	2.85	23	1.096	856 mV
12	0	0	24	2.124	1.504

Unit: Vrms

Table 13-11. IC102 (LSC4350)

pin #	MODES		pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz		800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	36 mV	20 mV	13	3.862	3.680
2	3.176	2.0	14	4.840	3.704
3	3.180	2.0	15	3.836	3.668
4	5.060	5.064	16	3.764	3.536
5	3.580	3.692	17	5.10	5.084
6	NC	NC	18	5.072	5.076
7	5.088	5.076	19	NC	NC
8	5.092	5.082	20	12 mV	8 mV
9	3.552	3.272	21	8 mV	8 mV
10	4.220	4.164	22	16 mV	12 mV
11	4.928	4.924	23	8 mV	8 mV
12	4.448	4.468	24	GND	GND

Unit: Vrms

Table 13-12. IC103 (LM324N)

pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	9.12	9.16
2	2.74	2.76
3	2.74	2.76
4	12.14	12.08
5	2.78	2.72
6	2.76	2.76
7	8.74	8.70
8	8.88	8.90
9	2.76	2.68
10	2.78	2.72
11	GND	GND
12	NC	NC
13	NC	NC
14	NC	NC

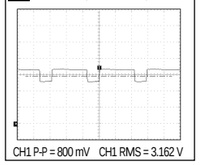
Unit: Vrms

Table 13-13. IC105 (LM2405T)

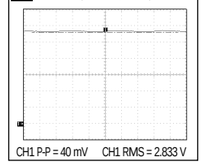
pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	51.20	50.08
2	50.72	49.44
3	50.04	48.72
4	GND	GND
5	2.44	2.48
6	2.36	2.50
7	12.08	12.10
8	2.48	2.56
9	71.32	71.12
10	GND	GND
11	GND	GND

Unit: Vrms

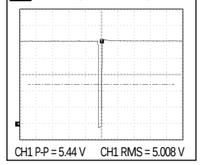
29 800 mV (IC101, #2)



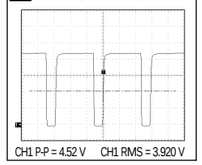
30 40 mV (IC101, #11)



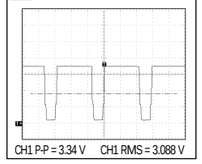
31 5.44 V (IC102, #18)



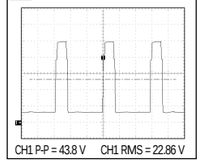
32 4.52 V (IC102, #5)



33 3.34 V (IC105, #8, 9, 11)



34 43.8 V (IC105, #5)



Memo